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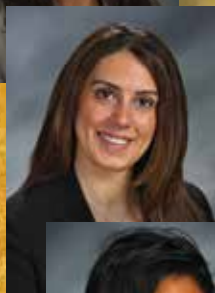
PRICING ADJUSTMENT

*Actuaries and Underwriters
and the Needed Evolution*

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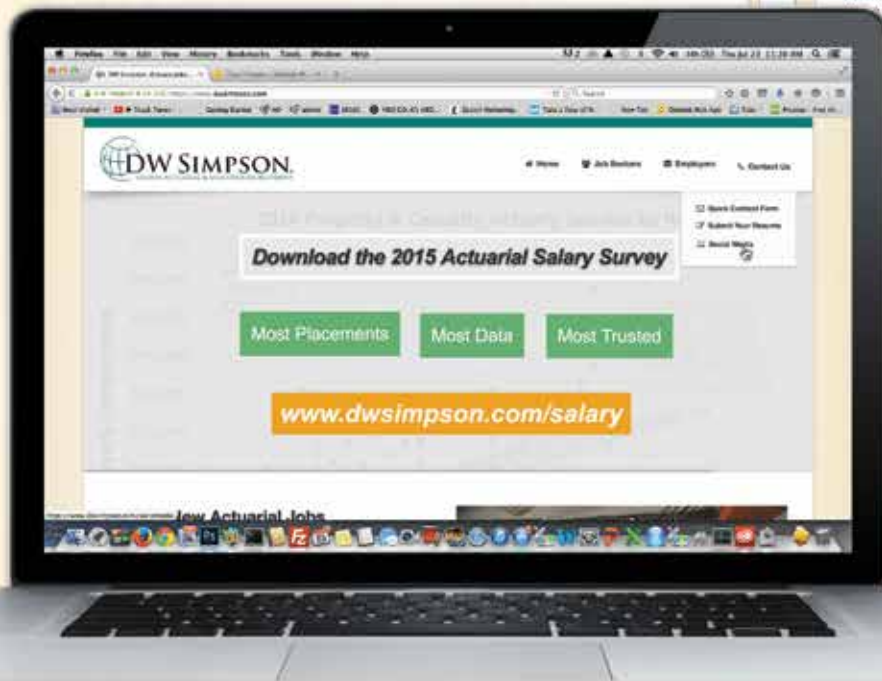
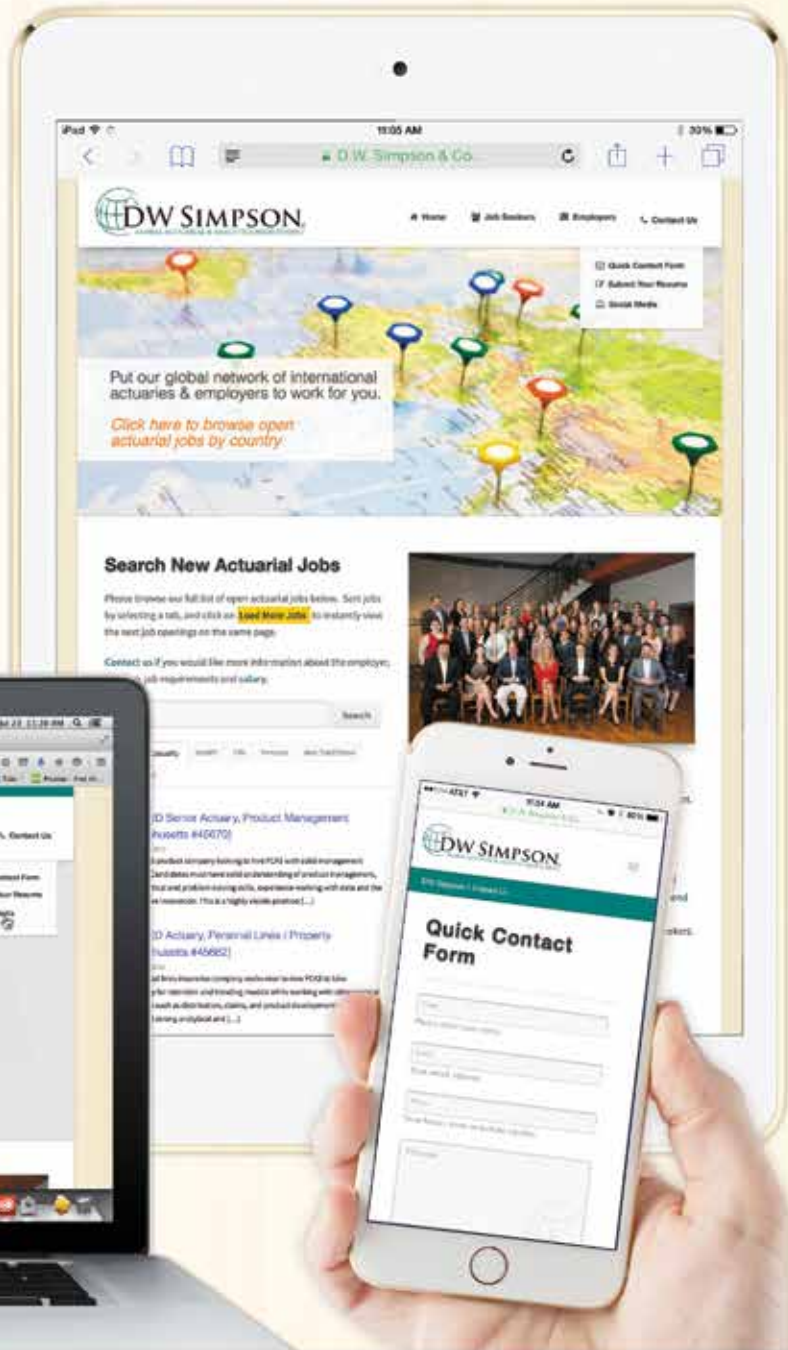
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editor's NOTE By GROVER EDIE

Cooperation is the Key

If we were to give a theme for this issue, it would be "cooperation."

You can learn about our new cooperative initiative with The Institutes, a move that reflects changing times and keeping up with new developments.

The cooperation among actuaries and others is an underlying theme of our cover story "Pricing Adjustment."

I recently met an underwriter for a medium-sized insurance company. Her job is to place applicants in the proper risk category when they are not clearly within a defined class. She places the risk in a class that she feels has similar expected medical costs, disability exposure or longevity.

Being aware of our *AR* cover story, I steered the conversation to the tension between underwriters and actuaries. She admitted there is some tension at her company. At first, we were inclined to blame the conflicts on length of service — the two professions have been around a long time and view risk differently. I wondered if the conflict was more likely among older professionals, but she countered that some of the oldest underwriters and oldest actuaries

have the best rapport with their professional counterparts.

Conflicts exist between nearly every professional group — nurses versus doctors, claims versus sales, agents versus underwriters, actuaries versus accountants, and the list goes on.

We came to the conclusion that neither the underwriter nor the actuary have all the information, and that they need to rely on each other to get a complete picture. The successful companies know how to make the different professions cooperate, rather than contest.

Reading the story about the rate-making seminar in Kuala Lumpur, I realize that cooperation has no borders. Within the USA, the CAS was a gold sponsor of the Gamma Iota Sigma International Conference.

But sometimes a long-standing cooperation will end. As Steve Lowe mentions in his President's Message, changing conditions can sometimes be a change for the better.

Finally, congratulations to the new Fellows, Associates and CERAs. I'll bet no one had to tell you to smile for your photo! ●

Actuarial Review always welcomes story ideas from our readers. Please specify which department you intend for your item: Member News, Solve This, Professional Insight, Actuarial Expertise, etc.

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What about the SOA? Questions and Answers

One of the great pleasures of becoming president of the CAS is the opportunity to meet and greet the membership, particularly the new Fellows and Associates. I spent a fair amount of time at the recent Annual Meeting in conversations with members, both old friends and new acquaintances. Sometimes I approached members to introduce myself and solicit their thoughts, other times they approached me with questions, advice and words of encouragement.

There were a number of recurring themes in these conversations, one of which was our relationship with the SOA. People typically asked how the CAS is responding to the competitive threat posed by the SOA, and what our current relationship is with the SOA leadership. They wanted to know what will happen if and when the NAIC accepts the SOA general insurance track as qualified to sign opinions. They also asked if the CAS is committed to remaining separate and, if so, why. Others wondered why the CAS didn't merge with the SOA for the benefits of efficiency and economies of scale.

All of these are good questions. First, our relationship with the SOA has improved considerably since the time that we declined their offer to combine forces and they launched their general insurance track. I would say it has moved from open hostility to détente, with respectful and congenial relationships at the leadership level. This is partly due to the passage of time and the annual turnover of leadership. It is also due to some efforts at reconciliation from both sides. For example, when I

first become president-elect, I reached out to my SOA counterpart, Craig Reynolds, suggesting we meet one-on-one for an informal conversation. That exchange turned out to be quite productive and has led to a regularly scheduled monthly talk. While we still don't agree on many things, we have both come to recognize that we were basing our views on differing narratives as to what had transpired. Getting each other's perspectives has helped us both have a more balanced view. Conversations with other leaders on both sides are also now regularly occurring.

Competition isn't entirely a bad thing ... competition has caused us to "up our game."

In many of my conversations with members, I did respond that I viewed the SOA as a competitor, rather than an existential threat — one with whom we can have a congenial relationship that encourages open dialogue. I sincerely believe that is the right way to view them at this juncture. They aren't bad people, they just have a different perspective. Partly my view recognizes that competition isn't entirely a bad thing. In the case of the CAS, competition has caused us to "up our game" in many ways. We have improved communications with employers through direct outreach and an invigorated Employer Advisory Council; developed Student Central, a great platform for interacting with students; expanded our university engagement program targeted at academics; and implemented some new ways to engage in member outreach, including targeted member surveys. We are innovating our basic education programs, adding statis-

tics and predictive analytics material to our exams to address the needs of future actuaries, and innovating in both the content and delivery technology of our continuing education programs.

Viewing the SOA as a competitor also means we aren't overly focused on what they are doing, in the firm belief that if we deliver better quality to our stakeholders we have little to fear from them. While we monitor the SOA's activities, most of the energy of the board, leadership and staff is focused on just being the best we can possibly be. As I said several times at the Annual Meet-

ing, "Apple didn't succeed as a company by focusing on what Microsoft was up to every day."

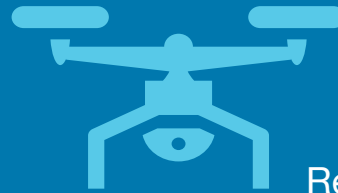
Finally, my views on the SOA reflect my firm conviction that we will continue to be the credential of choice, and that the SOA will not be successful in displacing us in the general insurance area. The CAS has the dominant position in market share and brand positioning. Our programs are of high quality. We have strong support among employers, who are the ultimate arbiters on credential requirements. We have unassailable scale to our basic and continuing education programs. And we are growing.

This brings me to the last question: Why not merge? I have put a great deal of thought into this over the last year. All organizations are, to an extent, historical accidents. Their formation was driven by the events and needs of the times in which they were established, and their

President's Message, page 8

DID YOU KNOW...

In 2014, the number of **data breaches** in the United States increased about **28%**¹



Reports estimate that worldwide spending on **drones** is expected to reach

\$93 billion by 2025²

The **TRIA** bill extension increases insurers' aggregate retention amount by

\$2 billion a year

to \$37.5 billion starting in 2016³



27 states and the District of Columbia have **enacted legislation** or adopted regulations that

regulate **ridesharing** **services**⁴



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1. Identity Theft Resource Center, Identity Theft Resource Center Breach Report Hits Record High in 2014, January 2015.

2. ISO, Exploring Drones: How Unmanned Aircraft Could Change the Way We Live, Work, and Think about Risk, November 2014.

3. I.I.I., Terrorism Risk and Insurance, June 2015.

4. ISO, Ridesharing Arrangements through Transportation Network Companies, October 2015.

President's Message

from page 6

evolution reflects changes in needs and circumstances over time. Therefore, we should never automatically assume that the status quo is best; rather, we should always challenge how things stand and be open to constructive change — even if it might be difficult or painful.

But even after trying to approach

We should never automatically assume that the status quo is best ... we should always challenge how things stand and be open to constructive change — even if it might be difficult or painful.

the question with as open a mind as possible, my view is still that the CAS should not merge with the SOA at this time. I don't believe it is in the best interest of the CAS stakeholders to do so. Certainly, circumstances could change, such that I would change my mind in the future, but not now. I like our culture and community, and I believe they would be put at risk by a merger.

I'm looking forward to further conversations with members on this and other topics important to our profession. In the next issue, I plan to describe some of my goals for the year. In the meantime, any thoughts or ideas you would like to share would be welcome. I'd like to hear from you. Drop me a line at president@casact.org. ●

COMINGS AND GOINGS

Craig Kliethermes, FCAS, MAAA, will assume the role of RLI Insurance Company president & COO as of January 1, 2016. Kliethermes had previously served as RLI's executive vice president, operations, since 2013. Kliethermes joined RLI in 2006 as vice president, actuarial services, and was promoted to senior vice president, risk services, in 2009. Prior to joining RLI, he served in executive positions with Lockton Companies, GE Insurance/Employers Reinsurance and John Deere Insurance Company.

Lockton has named **Justin VanOpdorp, FCAS, MAAA**, as the insurance broker's first chief analytics officer. VanOpdorp joined Lockton in 2006 and has more than 20 years of actuarial and analytical experience. He previously was an actuary and leader with GE Insurance Solutions, Fireman's Fund and Milliman.

Lockton also announced that **Mark Moitoso, FCAS, MAAA**, will join the company as senior vice president and

analytics practice leader. Moitoso is a 25-year veteran of Liberty Mutual Insurance, most recently serving as executive vice president and general manager of national accounts for Liberty Mutual in Boston.

Scott G. Sobel, FCAS, MAAA, has joined Oliver Wyman Actuarial Consulting, Inc. as principal. Sobel's responsibilities include serving as a lead predictive modeler and providing strategies for advancing to higher levels of analytical sophistication. Prior to joining Oliver Wyman, Sobel provided predictive analytics consulting services for EagleEye Analytics and has also held actuarial positions at the National Council on Compensation Insurance, Bankers Insurance Group and the Florida Farm Bureau.

FTI Consulting has appointed CAS Past President **Paul Braithwaite, FCAS**, as co-leader the firm's global insurance services practice. Currently serving as senior managing director at FTI, Braithwaite joined the company in 2009. He has held senior executive positions for more than 20 years in actuarial, underwriting and general management roles. Braithwaite has also served in a variety of CAS leadership roles, acting as vice president-administration (1994-1997) and as president (2005-2006). ●

EMAIL "COMINGS AND GOINGS" ITEMS TO AR@CASACT.ORG.

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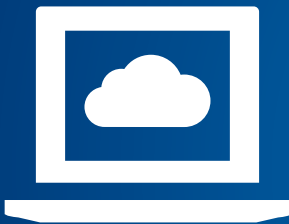
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IN MEMORIAM

Marvin E. Van Cleave (ACAS 1958)
1922-2015

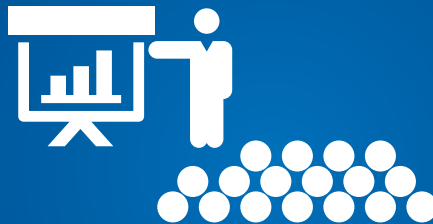


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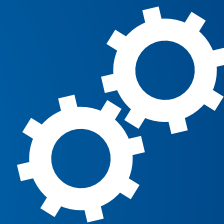
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TWENTY-FIVE YEARS AGO IN THE AR BY WALTER WRIGHT

Into the Futures

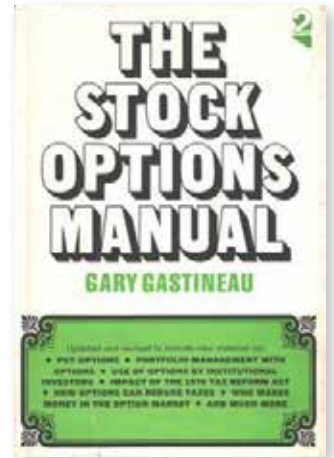
In early 1991, the pricing of futures contracts was virtually absent from our actuarial literature. The only such reference in the CAS research database prior to 1991 is a 1987 article by Robert A. Bailey, "Controlling the Cycle," but that was actually an ironic, tongue-in-cheek article about cattle futures whose purpose was to suggest that the insurance pricing cycles should not be regulated. Then in February 1991, Richard E. Sherman broke the ice with an article for the AR titled "Actuaries and Insurance Futures." The topic rapidly gained interest, and now a search of the CAS research database under the word "futures" turns up 21 articles. Mr. Sherman's article explained:

The Chicago Board of Trade has proposed the introduction of insurance futures as a new type of contract which may be exchanged on its trading floor in the near future. So far, such contracts have been proposed for automobile collision, health, homeowners and commercial property damage policies.

Of what import is this development to casualty actuaries? Will this innovation come into being without providing significant opportunities for casualty actuaries to apply their analytical skills and their ability to assess risks related to insurance? That

could well occur unless we take an active role in developing an understanding of this new type of contract and in seeking opportunities to interact with senior management on them.

Mr. Sherman continued to provide the reader with an overview of futures contracts and advice for further study. He explained how the insurance futures contracts would work, identified who the buyers and sellers would be and recommended a book, The Stock Options Manual, which he found to be useful. He also discussed the Black-Scholes model as a pricing tool for futures contracts, and concluded with discussions of hedging and market prices for these contracts. ●



ACTUARIES AND INSURANCE FUTURES

By Richard E. Sherman

The Chicago Board of Trade has proposed the introduction of insurance futures as a new type of contract which may be exchanged on its trading floor in the near future. So far, such contracts have been proposed for automobile collision, health, homeowners and commercial property damage policies.

Of what import is this development to casualty actuaries? Will this innovation come into being without providing significant opportunities for casualty actuaries to apply their analytical skills and their ability to assess risks related to insurance? That could well occur unless we take an active role in developing an understanding of this new type of contract and in seeking opportunities to interact with senior management on them.

What does insurance futures contracts should become the primary responsibility of the insurance department with financial companies. I would not agree with that position. To the actuaries, the primary responsibility of the insurance department is to advise the company on the proper use of the insurance contract. It is, however, the actuaries' responsibility to have the company's full attention to the subject that concerns the insurance business. That is, where the actuaries, equipped with the understanding and ability to apply the correct characteristics of the business, could have had in mind with each contract, the actuaries should have the ability to advise the company on the proper use of the insurance contract.

Contract Mechanism
How do such contracts work? Let's consider a typical insurance futures contract. December 1990 contracts would have a value of \$100,000 of insurance on a bond of economic collision between all of these ten months, which occurred in January 1991. The purchase of a contract to buy the right to receive a cash settlement based on the "gross profitability" of the gross book of policies—as it stands at the end of October 1991. "Gross profitability" is defined as premium less reported accident losses, with no deduction for expenses. If ten percent more business is written by October 1991 contracts at \$100,000, each purchase of a December contract will be certified to a cash settlement at the end of October 1991 equal to ten percent

of the gross profitability of the book at that time. Conversely, if no business is written, the contract would then be worth \$30,000. What is surprising, however, is that such contracts will probably trade around \$40,000 when they are first offered to investors.

Who Benefits?
Typically, insurance companies will be selling such contracts, while the buyer will be individual risk takers and speculators looking to make a profit. In a highly leveraged contract, an individual can control a large percentage of the market with a relatively small amount of money.

Typically, insurance companies will be selling such contracts, while the buyer will be individual risk takers and speculators looking to make a profit. In a highly leveraged contract, an individual can control a large percentage of the market with a relatively small amount of money.

A Useful Book
A book which I have found most useful in understanding insurance futures is "The Stock Options Manual" by Gary Gastineau. It is a highly readable book which contains a great deal of information on the subject of stock options.

The "regimental" distribution of stock options is a function of the actual distribution of stock prices. The actual distribution of stock prices is a function of the distribution of future prices. The actual distribution of future prices is a function of the distribution of future prices. The actual distribution of future prices is a function of the distribution of future prices.

Risk Conference
The Actuarial Society of America has a Risk Conference which is held annually. It is a conference which is held annually. It is a conference which is held annually.

Black-Scholes Model
The Black-Scholes model is a pricing model for options. It is a model which is used to price options. It is a model which is used to price options.

Conclusion
The introduction of insurance futures is a new development in the insurance industry. It is a development which is expected to have a significant impact on the insurance industry. It is a development which is expected to have a significant impact on the insurance industry.

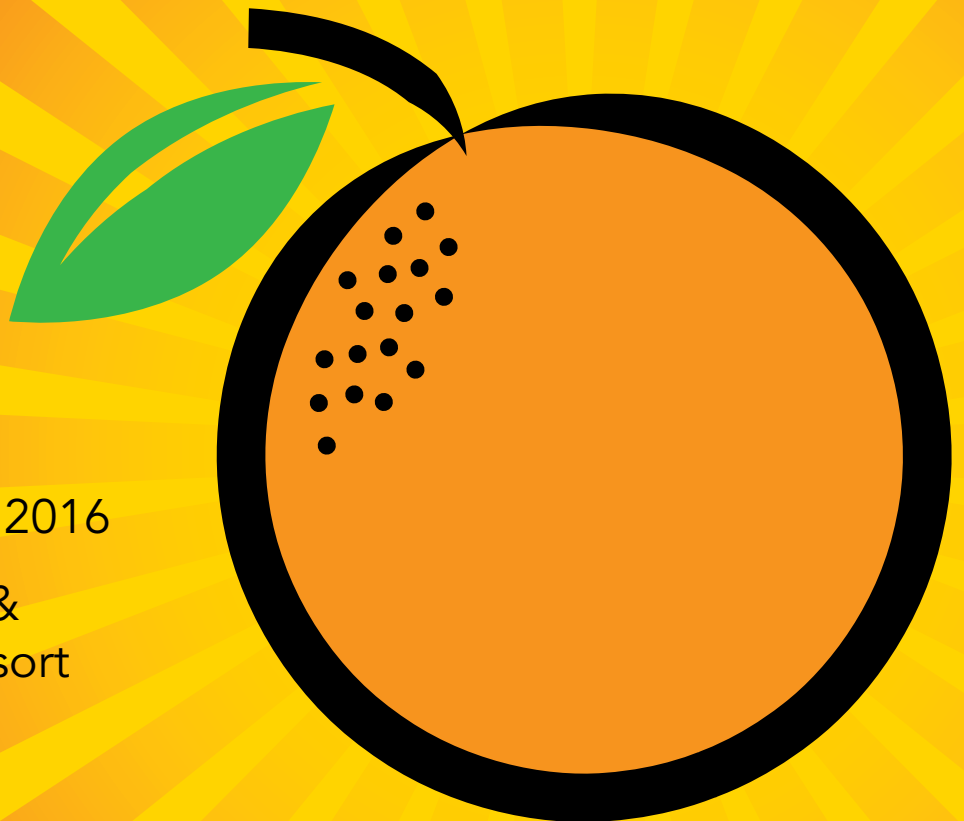


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CAS STAFF SPOTLIGHT

Meet Alice Chambers, Marketing and Corporate Relations Manager

Welcome to the CAS Staff Spotlight, a column featuring members of the CAS staff. For this spotlight we are proud to introduce you to Alice Chambers.



Alice Chambers

- **What do you do at the CAS?**

As the marketing and corporate relations manager, I oversee the CAS Society Partners Program, work with exhibitors, sponsors and advertisers at CAS conferences, and am the staff liaison for the Employers Advisory Council. I also promote CAS conferences and the Career Center.

- **What do you enjoy most about your job?**

I value working with CAS Society Partners and helping them to develop relationships with our members. I am also excited about the logistical planning for exhibitors, sponsors and advertisers at CAS conferences.

- **Hometown:**

Richmond, Virginia.

- **College and degree:**

I graduated from Elon University in North Carolina where I was an international studies major and communications minor.

- **First job out of college:**

I worked for an event-based marketing and communications firm in D.C. We produced high-profile national and international events

that focused on brand elevation for our clients.

- **Describe yourself in three words:** Friendly, ambitious, dedicated.
- **Favorite weekend activity:** Over the weekends I have fun exploring D.C. with friends and also traveling to new places.
- **Favorite travel destination:** That's a tough choice, but I think that Portugal has been my favorite travel destination. There are so many unique and beautiful parts of the country, but I particularly enjoyed the city of Porto and the area surrounding the Duoro River Valley.
- **One interesting or fun fact about you:** I was fortunate enough to study abroad three times. In high school I spent a month in Cádiz, Spain, and in college I spent a month in Costa Rica and a semester in Florence, Italy. ●

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ENTERPRISE RISK
MANAGEMENT SYMPOSIUM

The CAS Helps Celebrate Gamma Iota Sigma's 50th Anniversary

BY TAMAR GERTNER, CAS UNIVERSITY ENGAGEMENT MANAGER

The CAS participated as gold sponsor of the Gamma Iota Sigma International (GIS) Conference, October 8-10, 2015, in Rosemont, Illinois. The conference celebrated the 50th anniversary of Gamma Iota Sigma, the International Risk Management, Insurance and Actuarial Science Collegiate Fraternity. More than 550 students from 53 colleges and universities attended — the highest conference attendance in 45 years.

Each year, the GIS Conference offers the CAS an opportunity to educate students about the P&C career and showcase new CAS resources. Last year, the CAS focused on promoting its new membership program, CAS Student Central. This year, the CAS counts 1,800 GIS members among its 3,400 CAS Stu-

dent Central members.

The CAS conducted two interactive educational sessions: “Excel for Actuaries,” presented by Derek Wong, FCAS, of CNA Insurance Companies, and “Basic Ratemaking,” presented by Wasim Chowdhury, FCAS, Allison Salisbury and Kelli Chupp of Allstate. CAS Board Member Camille Minogue, FCAS, shared details of her career path on a C-suite panel presentation. Minogue, fellow board member Wes Griffiths, FCAS, and CAS booth volunteers Wong and Chowdhury also spoke with several students at the conference career fair.

CAS staffers Mike Boa and Tamar Gertner also presented to university faculty and industry partners at the Faculty Roundtable and the Industry Partners Session. ●



Pictured from left to right are Tamar Gertner, Camille Minogue and Derek Wong.



GAMMA IOTA SIGMA

International Risk Management, Insurance and Actuarial Science Collegiate Fraternity

About Gamma Iota Sigma

Incorporated in 1965, Gamma Iota Sigma promotes, encourages, and sustains student interest in insurance, risk management and actuarial science as professions; encourages the high moral and scholastic attainments of its members; and facilitates interaction of educational institutions and industry through networking and by fostering research activities, scholarship and improved public relations. Gamma Iota Sigma has an annual membership of over 2,500 students at 65 colleges and universities throughout North America and an alumni network of more than 20,000 individuals. For more information, contact GIS Headquarters at (484) 991-4471 or visit www.GammalotaSigma.org.

A Scholarship that Pays in More Ways than One

BY ISABEL JI, CAS TRUST SCHOLARSHIP RECIPIENT

For more than a decade, the CAS Trust Scholarship has been awarded annually to post-secondary student leaders dedicated to a career in casualty actuarial science. I am grateful to have been selected as one of this year's winners and thrilled to have been offered an invitation and all-expenses-paid trip to the 2015 CAS Annual Meeting in Philadelphia, on top of the hefty \$10,000 check towards my university tuition.

Attendance at the Annual Meeting is a valuable professional development opportunity — and a rather rare one for pre-ACAS candidates. (A surprising number of my interactions with other attendees included the following exchange: “Are you a new Associate? New Fellow?” “Neither.” “Wait, how are you here?” “I won a scholarship!”)

I attended several fascinating conference sessions, which ranged broadly from an interactive workshop that taught us how to more effectively present technical topics; to a presentation about the current connection between data science and actuarial science; to a guest keynote showing us how actuaries, as business professionals, can apply marketing principles to make our ideas more “contagious.”

The presentations were interspersed with numerous networking breaks, giving attendees a chance to refresh old connections as well as forge new ones. The CAS Student Program, a full-day event tailored for a select group of CAS Student Central members, was yet another forum in which to connect, this time with volunteer mentors and actuarial students from local colleges.



Isabel Ji

The CAS Trust Scholarship is much more than a (material) offset to tuition costs. It is an uncommon chance to meet and learn from actuaries across all geographies and all casualty actuarial disciplines — people who may have traveled down the very paths that I aspire to navigate in my own actuarial career. It is a way to educate myself about the profession that I seek to join, the challenges that it is facing, and the brilliant efforts of actuaries and other risk managers to turn those obstacles into opportunities.

For more information on applying for the scholarship, visit casact.org/trustscholarship. ●



The author and CAS President Bob Miccolis.

Isabel Ji is a fourth year actuarial science and economics student at the University of Waterloo and is currently completing an internship at Intact Financial in Toronto, Canada. She has previous experience with Intact in commercial lines and personal lines pricing, and has also interned in U.S. P&C consulting. She has held several leadership positions within the Actuarial Students' National Association, an organization run by and for undergraduate actuarial students across Canada.

The CAS Honors 2015 Award Recipients

BY MATT CARUSO, CAS MEMBERSHIP & VOLUNTEER MANAGER

Each year more than a third of CAS members participate as volunteers. Some of them have gone “above and beyond” for a focused and finite project over the course of a year. Some are new to volunteering and the CAS but have exhibited outstanding leadership. Others are long-time volunteers who have devoted their time and energy throughout their careers to elevating and advancing the actuarial profession. The CAS honored eight such exceptional CAS volunteers at an awards luncheon on November 16 during the 2015 CAS Annual Meeting at the Philadelphia Marriott Downtown.

The Above and Beyond Achievement Award

The Above and Beyond Achievement Award (ABAA) recognizes short-term volunteer contributions during the previous year.

Paul Brehm (FCAS 1989), a University of Minnesota alum, was awarded a 2015 ABAA for his work in university engagement. After a University of Minnesota professor approached him with an idea to create and teach a case study for actuarial science students, Brehm not only wrote the material but recruited three actuaries to help with the presentations and provided dinner for the students. Brehm also made himself available outside of the classroom, which gave the students a glimpse of the types of projects a property-casualty actuary might work on. Brehm enjoys giving back to the school and teaching about P&C insurance, particularly because many actuarial programs are focused on



Paul Brehm



Emilee Kuhn

life and health actuarial practice, “I feel like I can bring a real-world flavor to the course,” Brehm said.

Emilee Kuhn (FCAS 2010) received a 2015 ABAA for her efforts on the Committee on Professionalism Education (COPE) leading a subgroup that came up with new ways to present continu-

ing professionalism education material. The COPE subgroup revamped games such as *Jeopardy!* and *Family Feud* into audience-participation sessions that have been immensely popular with the CAS members. “The best part is when people come up to you and tell you how much they enjoyed the presentation,” Kuhn said. “I love that!” Kuhn also led the formation of a library of professionalism continuing education resources that includes up-to-date copies of presentations. The materials are available to all committee members and can be used for professionalism sessions at CAS or Regional Affiliate meeting. “I have had the opportunity to work with a lot of really great people throughout the CAS,” said Kuhn. “I now consider them friends.”

For ABAA recipient **Michael R. Larsen** (FCAS 1982), the most satisfying result of working on the Examination Committee is shaping the future for the next generation of actuaries. He has served Exams continuously for the last 12 years and 20 years out of the last 30. Larsen anticipated the trend of exams covering more statistics and was instrumental in creating the S1 and S2 syllabus for Exam S, which one of his nominators described as “one of the most important changes to the CAS education system in decades.” Volunteering also keeps Larsen learning new things. “I find that writing questions causes me to look at material I have seen before in a new way and helps me in a professional sense,” said Larsen.

Elizabeth Merritt (FCAS 2010) was awarded an ABAA for her work leading



Michael Larsen

the CAS Student Central working group. Student Central is a new membership program for university students and part of the CAS strategic initiative of university engagement. Merritt has brought energy and structure to the group, organizing members and students to better the Student Central website. Leading by example, she has recruited volunteers for web content and inspires others with her hard work. I have always found great satisfaction in volunteering,” said Merritt. Along with her work with students, Merritt is an officer for the Midwestern Actuarial Forum, a CAS Regional Affiliate, and serves on the Examination Committee. “In each of these cases,” she said, “I have expanded my network, met some wonderful people and made connections that will last throughout my career.”

New Member Award winner Jennifer Balester and CAS President Bob M. Miccolis.



Elizabeth Merritt

The New Members Award

The New Members Award (NMA) recognizes volunteer contributions during an individual’s first five years from their most recent credential.

Jennifer Balester (FCAS 2012) received an NMA for her work on the Examination Committee, which she joined the first sitting after her Fellowship. Balester’s dedication to CAS admissions was soon recognized, and she

became the Exam 5 writing vice chair after only one year. Balester’s nominator wrote, “She has a positive attitude that is contagious, and her work and contributions are always at a high caliber.” In addition to her role as vice chair, she has continued to write and grade questions. “I love to see the passion that everyone brings to the Exam Committee,” she said. “Everyone from the newest Fellow to the 20+ year committee veteran strives to ensure that we are providing a high quality educational experience to students.”

In his relatively short time with the CAS, **Dan Tevet** (FCAS 2011) has proven himself an exemplary volunteer. His NMA primarily recognizes his work on the Candidate Liaison Committee (CLC), where he has served as a candidate representative, committee member and now chairperson, and has contributed numerous *Future Fellows’* articles. His other volunteering activities include presenting at meetings and online webinars, and serving on the Member Advisory Panel Committee, the Commit-





Dan Tevet

tee on Professionalism Education, and the Examination and Syllabus Committees. Tevet volunteers because he wants the actuarial profession to be valued and respected into the future. “We need to ensure that the CAS continues to train and credential high-quality professionals with the necessary skills to do good work,” said Tevet.

“The candidates and new members are the life-blood of our society.”

— Virginia Prevosto

The Matthew Rodermund Memorial Service Award

The Matthew Rodermund Memorial Service Award annually acknowledges CAS members who have made considerable volunteer contributions to the actuarial profession over the course of their career.

As a CAS volunteer leader, **Virginia Prevosto** (FCAS 1982) has used her experience to make tough decisions.



Virginia Prevosto

She began serving on the Examination Committee in 1984 and then branched out to other committees and task forces revolving around basic education and admissions. “I soon realized how important and critical these areas are to the CAS,” said Prevosto. Her service has included terms on the Syllabus Committee, the Candidate Liaison Committee

(a term as chair), and the Committee on Management Data and Information (a term as chair). But in 2012, while serving as the CAS vice president-admissions, Prevosto faced one of her toughest challenges when the United States’ Mid-Atlantic coast was hit by Hurricane Sandy, coinciding with the CAS fall examination sitting. She led the CAS staff and the Examination Committee to ensure that all test takers affected by the hurricane

were able to attend an exam sitting. “The candidates and new members are the life-blood of our society,” said Prevosto. Her commitment to CAS exams has benefited test takers all over the world.

Like many CAS volunteers, **Sheldon Rosenberg** (FCAS 1976) got his start on the Examination Committee. This led to years of diverse volunteer service to the CAS with many leadership roles, including chair of the *Actuarial Review* Editorial Board and the Ratemaking Seminar, Continuing Education and Audit Committees. He also served on the Discipline Committee and the CAS Board of Directors, and as vice president-administration. A recognized leader known for his sense of fairness, Rosenberg was chosen to head up the Task Force on Classes of Membership, which dealt with complex organizational issues. Sheldon Rosenberg and his lifetime of service illustrate the path many heralded volunteers have taken to accomplish a variety of CAS initiatives.

Congratulations to all of our 2015 volunteerism award winners! ●

Please help the CAS recognize outstanding volunteers by nominating worthy members for the 2016 Above & Beyond Achievement Award, New Members Award or Matthew Rodermund Memorial Service Award when invited to do so in May. If you have questions about the awards, please email Matt Caruso at the CAS office (volunteer@casact.org).

VALUED

At the CAS, we strive to be a valued and trusted resource for risk professionals, giving them unparalleled support as they develop professionally and advance their careers.

Learn more about our premier educational resources and training for the global community of property and casualty experts at casact.org/valued.



**100 Years of Expertise,
Insight & Solutions**

www.casact.org

NEW FELLOWS ADMITTED IN 2015



Row 1, left to right: Yee Ting Lois She-Tom, Wenqian Zhou, Kimberly Shaffer, Yi Zhuang, **CAS President Robert Miccolis**, Julia B. Lui, Kylie Lucinda-Marie Justo, Feng Chen, Mujiao Li.
Row 2, left to right: Charles Cervinka, Nicholas J. Getter, Henry Ding Liu, Lauren Rachelle Ford, Kimberly Walker Guerriero, Karen Allyson Kazun, Lev Kamenetsky, Pei Ying Goh, Jessica Marie Grow, Maria Ann Agostinone.
Row 3, left to right: Cody Lee Marsh, Jeffrey James Cecil, Jeffrey A. Buero, Chad Richard Jenkins, Valerie Nicole Albers, Chan Ip Chio, Bryan Ray Trone, Ryan Janovitz, Lauren Ann Train.



Row 1, left to right: Eric McInturff, Margaret Mary Kelly, Richard Christopher Lally, Natalie Anne Barth, **CAS President Robert Miccolis**, Heather D. Lake, Eric Harvey Anderson, Michael Justin Fairchild, Gina R. Badowski.
Row 2, left to right: Pascal Boucher, Samantha Lee, Nicolas Lehoux, Lisa Marie Pankau, Daniel Enrique Fernandez, Matthew Jahnke, Matthew M. Iseler, Ross Martin Brotherston Sr., Charles Wang Lei.
Row 3, left to right: Gabriel Belanger, Jonathan C. McBeath, Blake Timothy Berman, Brian Drissel, John Stephen Koo Lam Tseung, Matthew Charles Van Vleet, John Le, Steven Luther Martin.



Row 1, left to right: Sarah Power, Michelle Moyer, Conor A. Redmond, Sean P. Bailey, **CAS President Robert Miccolis**, Rebecca Min Knackstedt, Kathleen M. Knudson, Thomas Christopher Werner, Richard A. Wein.

Row 2, left to right: Andrew Coleman, Alisa Havens Walch, Kenneth Scott Klassman, Niravkumar N. Modi, Florian Richard, Matthew Robert Roddy, Patrick Thomas Stapleton, Christopher A. Harris, Matthew Joseph Murdock, Jim Thanos.

Row 3, left to right: Natigorn Chutintararuk, Ishan S. Shukla, Steven Edward Phillips, Timothy Cameron Vosicky, Timothy James Walant, Daniel Francis White, Thomas Michael Hartsig, Wei Wang, Leigh J. Murdick.



Row 1, left to right: Anton A. Hu, Christine Rebecka Luthi, Jolin Shi, Simon Deschatelets, **CAS President Robert Miccolis**, Silvana Sarabia Quiroz, Syntheia W.H. Sin, George Christopher Nicholas, Sarah Haberman.

Row 2, left to right: Scott Sellers, Dev M. Patel, Jeffery C. DiFranco, Jiafeng Sun, Michael S. Nelson, Sun Sun, Ben Henig, Andrew Michael Weinecke, Nicholas Hinzman.

Row 3, left to right: Daniel Bruno Jr., Vasilis Panagiotis Dikeakos, Joshua Jacob Newkirk, Jean-Christophe Sauriol, Alec J. Richards, Ryan Scott Shackelford, Corey M. Kientoff, Ryan R. Samaratunga, Michael B. Cunningham, Rino Thouk, Terrie Marcus Tin.

New Fellows not shown: Wendy Alonso, Scott Nelson Applequist, Joseph Daniel Buehner, Joanna B. Byzdra, Jesse Theobald Carroll, Derrick C. Chen, Robert Jonathan De Jesus, Kevin P. Donnelly, James W. Doxey, Christian Thomas Hammond, James H. Hollman, Wei Hsiang, Guangyu Hu, Hsin-Hong Lai, Thanyanop Lausuksringam, Mingwei Lei, Chen Justin Liang, Jakkapan Luangnarumitchai, A.J. Charles Markham, Miekael Menberu, Easter H. Namkung, Jin Ye Ngu, Erin M. Olson, Alan M. Parham, Cristina Pop, Daniel David Reed, Vera P. Sakalova, Brian P. Scott, Abigail G. Shahriyar, Christopher Y. So, Kasin Sutuntivorakoon, Zongwen Tan, Alexander E. Timm, Jeffrey A. Turner, Mitchell Lee Underwood, Alex T. Wesseling, Katherine A. Williamson, Ashley Wohler, Marcus M. Yamashiro, Chuan Yan, Eecher Yee.

NEW ASSOCIATES ADMITTED IN 2015



Row 1, left to right: Bryan David Chapman, Marco Augustus LoConte, Jacob Matthew Robertson, Ira Robbin, **CAS President Robert Miccolis**, Shree Hari Adhikari, Kathryn S. Pollmann, Stacy Joan Kearney, Jing Yan.

Row 2, left to right: Christina Lynn Lutz, Nicholas David Crugnale, Matthew D'Armi, Raymond Hoi Leung Yung, Gang Yang, Jeremiah Woods, Scott Keim, Andrea A. Everling, Alan Kessler.

Row 3, left to right: Todd Remias, Eric Chan, Weiming Hong, Min Gu Lee, Carole B. Schumacher, Samantha Jaeger, Christina C. Oda.



Row 1, left to right: Yue Huang, Haifeng Lin, Andrew Deven Chandler, Michael Andrew Croxton, **CAS President Robert Miccolis**, Samanvitha Vangala, Lance M. Clevenger, Kayla M. Newman, Derek Arthur Steffan.

Row 2, left to right: Jonathan A. Fesenmeyer, Hoi Cheng Fong, Karine Kaprielova, Michael Paul Ruggiero, Thomas Jackson Rowell, Michael Bersch, Kevin Patrick Frisch, Jessica R. Nolan.

Row 3, left to right: Christopher Michael Wunderlich, Yuet Ying Dorothy Fong (ACAS May 2015), Eric John Yskes, Qi Shen, Jonathon S. Finch, Joshua Layne Minshall, Robert W. Justice, John Earl Englebert, Munsif N. Karim.



Row 1, left to right: Andrew Joseph Krieger, Ria Zhou, Xuyan Shi, Kristen Leigh Schuck, **CAS President Robert Miccolis**, Xian Liu, Monica Huang, Nazleen Ashraf, Ellen Joy Myerson.

Row 2, left to right: Robert Baird Stewart, Abigail Joy Korthals, Adam Michael Pevarnik, Brian Todd Bennett, Esaie Djossou, Tracy Yin, Julie Elizabeth Menken, Christopher Michael Harris, Keith Young.

Row 3, left to right: Frederick Oliver Larson, Kendra Ward, Brian William Phelps, Jessica Efstathiou, Jon Kiefer, Freeman Kurt Miller, Ut Fong, Matthew Edward Miller, Spencer Roach.



Row 1, left to right: Fei Jia, Raksa Wimonstuthikul, Simone Pereira, Yanlin Dai, **CAS President Robert Miccolis**, Christian Posadas, Shyang Bin Wong, Evan S. Palumbo, Matthew Thomas Vallo.

Row 2, left to right: Nathaniel Jacob Wleczyk, Michael David DeLucca, Rafael Rocha Da Costa, Judy JieZhen Wu, David Clapp, John William Clabots, Francois-Luc Dallaire, Myra-Kim Fortin.

Row 3, left to right: Brandon Scott Shain, Nathan James Baseman, Marc-Antoine Gelin, Kyle Gorski, Zhouliang (Joel) Li, Chi-Fan Wei, Brandon Eric Edgbert, Jonathan Choi, Won Keun Chang.

NEW ASSOCIATES ADMITTED IN 2015



Row 1, left to right: Nicholas Chrzanowski, Hervey K. F. Abotsi, Yair Bar-Chaim, Gene Dan, **CAS President Robert Miccolis**, Susan K. Nichols-Horan, Yucen Yin, Dereck Tanaka, Kristine May Bataclan.
Row 2, left to right: Scott Andrew Lorne McGorman, Saleh Lalani, Ziqing Liu, Grant T. Donkervoet, Mark G. Cichra, Jonathan David Seelig, Nathaniel Lee Schmitt, Brent Taub.
Row 3, left to right: Anthony S. Diaz, Nicholas Metaxas, Ian Colan Mui, Nathaniel N. Yankelev, Robert Zolla, Brandon Bard, David Anthony Reyes, Corey Vaughan.



Row 1, left to right: Susana Gisele Zelaya, Mahee Turcotte, Megan Margaret Callahan, **CAS President Robert Miccolis**, Briana M. Krol, Jeffrey Peter Hanschmann, Joyce A. Hwu.
Row 2, left to right: Charles Bernier, Jason Arthur Scott, Justin Steven Zaugg, Scott William Kelly, Brendon Mark Donahue, Thomas F. Wright.

New Associates not shown: Vinaya Adusumilli, Rebecca C. Baldyga, Matthew Lloyd Barker, Jonathan Baumann, Justin N. Bell, David James Broomhead, Jonathan Brophy, Bich-Quyen Bui, Constantine W. Chan, Samuel Nicholas Charters, Brock P. Childs, Herman Chow, Molly Cline, Katelyn Renee Crunk, Wei Ding, Matthew Daniel Dufek, Ralph M. Dweck, Bradley A. Frost, L. Samantha Glover, Wenyi Gong, Timothy Neale Greeno, Xin Guo, DongMei Han, Andrew Thomas Hutchinson, Seth Alexander Jackson, Cory Brandon Johnson, Frédéric Khuong, Kien Weng Koh, Prince Gurpreet Kohli, Shaoli Li, Ruide Lin, Jianbin Liu, Simin Liu, Manyi Luo, Alyssa Renee Martin, Glen Eric Meyer, Veronika Molnar, Suh Sin Moo, Stephen Nash, Carlos Enrique Nunez, Arifa Nusrat, Brian J. O'Reilly, Sabrina Paradis, Gabriel James Plano, Ryan Purcell, Michael D. Ricker, Simon Noel Roberge, Bradley Ray Rockers, Carly J. Rowland, Cunhua Shi, Monica Marie Shokrai, Mikhail Skorobogat, Owen Geoffrey Smith, Peter C. Strada, Martin Surovy, Philip M. Trick, Kar Leng Wai, Li Wang, Lu Wang, Derek Dale Watson, Christopher Keim Wetzel, Anson Yan-Hei Wong, Jing Yean Wong, Shyang Bin Wong, David Wright, Kyung Min Yoon, Wenjing Zeng, Li Zhu.

NEW FELLOWS BY MUTUAL RECOGNITION ADMITTED IN 2015

Krishaanth Shanthikumar, FCAS

Fellow, Institute of Actuaries of Australia
QBE Americans, Inc.

Babak Termeh Baf Shirazi, FCAS

Fellow, Institute and Faculty of Actuaries (U.K.)
Armour Group Holdings Ltd.

NEW CHARTERED ENTERPRISE RISK ANALYSTS



New CERAs, left to right: *Marcus M. Yamashiro, FCAS; CAS President Robert Miccolis; Erin Gerber Davidson, ACAS.*
New CERA not shown: *Abigail G. Shahriyar, FCAS.*

Scenes from the CAS 2015 ANNUAL MEETING



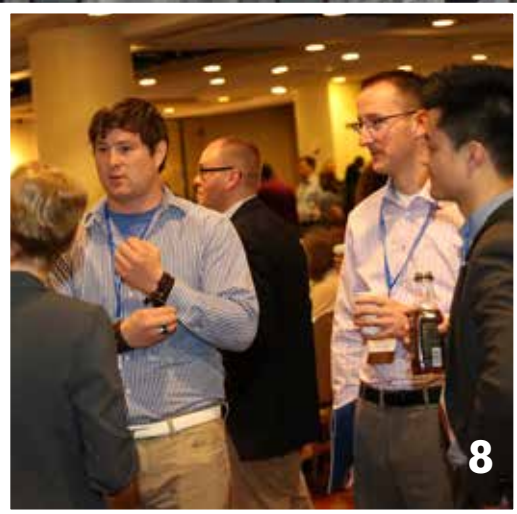


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1. *Mixing and mingling at the reception for New Associates.*
2. *A group of friends take a break from the exhibits at the Franklin Institute at the Tuesday night dinner. Left to right are CAS Fellows Sarah Power and Joanne Yammine, and CAS Associates Marion Grégoire-Duclos and Susana Gisele Zelaya.*
3. *Diana Rangelova (left) and David R. Clark (right) received the 2015 Ronald Bornhuetter Loss Reserve Prize for their paper, "Accident Year/Development Year Interactions," which was published in the Fall 2015 E-Forum.*
4. *Daniel Bauer (left) and George Zanjani (right) won the 2015 Charles A. Hachemeister Award for their paper, "The Marginal Cost of Risk in a Multi-Period Risk Model."*
5. *Jonah Berger was the Annual Meeting featured speaker. Berger is the author of the New York Times and Wall Street Journal bestseller, Contagious: Why Things Catch On.*
6. *Dr. Bob Hartwig of the Insurance Information Institute spoke at the Annual Meeting's opening general session, "Overview and Outlook for the P&C Insurance Industry: Trends Challenges and Opportunities."*
7. *Bob Miccolis (left) poses with newly minted FCAS Yee Ting Lois She-Tom (center), along with her husband (right) and their two children during the reception for New Fellows.*
8. *More mixing and mingling at the welcome reception.*
9. *Gary Koupf, Christopher Steinbach, Mike Blivess and Anne Kelly enjoy a drink at the Tuesday night dinner at Philadelphia's Franklin Institute.*
10. *CAS President Bob Miccolis (far right) presents the 2015 ARIA Prize to authors (from left to right) Edward Frees, David Cummings and Glenn Meyers. The paper, "Insurance Ratemaking and a Gini Index," was presented at the Annual Meeting. The prize is awarded to the authors of a paper published by the American Risk and Insurance Association that provides the most valuable contribution to casualty actuarial science.*



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10

PRICING ADJUSTMENT

Actuaries and Underwriters and the Needed Evolution

By ANNMARIE GEDDES BARIBEAU

*Both actuarial and underwriting
roles need to evolve to assure
successful predictive modeling.*

Because of their respective roles, actuaries and underwriters approach pricing in different ways. Actuaries focus on facts and data, looking at the averages and the aggregates; underwriters rely more on their professional experience, homing in on the individual risk. The actuarial perspective reflects the big picture; the underwriting considers the details of individual risks.

When predictive modeling enters the scene, however, the need for a strong working relationship between actuaries and underwriters intensifies. Predictive modeling is a benefit to actuaries, but underwriters can find its fine-tuned predictions counterintuitive, if not threatening, to their traditional roles.

“Going forward,” said Scott P. Weinstein, KPMG LLP’s U.S. lead of property and casualty actuarial services, “the market will be dominated by those companies exhibiting the combined strength of the actuary and the underwriter.”

When underwriters and actuaries have a strong working relationship, the result is greater than what each professional offers alone, said Bret Shroyer, solutions architect for Valen Analytics, a provider of proprietary data, analytics and predictive modeling.

In a case study, he examined the actual loss ratio relativity by risk score using predictions from both the underwriting group and the predictive model and combined and averaged

the score of each. “The results were striking,” he said. The underwriting group identified nearly 70 points of lift; the predictive model, 125 points of lift. The combination of the two generated nearly 200 points of lift. (See Chart 1.)

Getting to that point, however, does not necessarily come easily.

Underwriter’s Perspective

Given the time and effort actuaries invest to offer recommendations, they can find what underwriters do with the information a bit disconcerting. Underwriters live in the everyday realities of how pricing affects everyone, said Chuck DiGrande, assistant vice president of personal lines underwriting for The Andover Companies, which uses predictive modeling on a limited basis.

Sandwiched between actuaries and marketers, underwriters have to consider how insurance commissioners, agents and customers will respond to changes in price, he added. “If you make a filing that adheres strictly to an aggres-



Chart 1

Underwriters Have an Excellent Point

The best results include their expertise



Source: Valen Analytics. Used by permission.

sive actuarial indication, a state regulator may gag on it. That has been our experience.”

Further, when prices rise too quickly, he said, insurers and agents may lose valuable customers due to sticker shock, so rates might not increase as quickly as actuaries would prefer. This is where the experience, instinct and intuition of underwriters come into play. “We have to put all that in a blender and figure out what are we going to go with [it],” he said. “Responsible pricing is a must at the end of the day ... balancing market conditions with actuarial recommendations is an art form.”

It is common, however, for insurers to experience internal pricing disputes between actuaries and underwriters, according to results from the Valen Analytics study released in September 2015 titled, “Are Underwriters & Actuaries At Odds Over Price?”¹

More than three-fourths (77 percent) of 201 property-casualty professionals surveyed indicated they face pricing disputes between actuaries and underwriters. Of those, 19

percent said it is because actuaries are too conservative while another 16 percent said that underwriters are too optimistic/aggressive.

Shroyer, a property-casualty actuary, said when he developed rates earlier in his career, “the standard goal was always to build in a margin on the price side because you knew the underwriters were going to be more aggressive in the final price.” This practice might explain why 21 percent in the Valen survey said that actuarial rates are too high for the market.

Another 43 percent cited underwriters for dismissing data over judgment as the reason for pricing conflict. Actuaries are often frustrated by the tendency of underwriters to not trust the data results, Shroyer said.

Enter Predictive Modeling

Nearly 20 years ago, predictive modeling was a cutting-edge approach to pricing personal automobile insurance. By the end of the last decade, commercial insurers began applying predictive analytics, thanks to technological innovation and

¹ <http://valen.com/press-releases/internal-conflict-over-pricing-points-to-a-fundamental-issue-in-pc-insurance/>.

growing data sources. This pricing approach has since evolved to a best practice and is also being applied in other ways.

Towers Watson’s annual predictive modeling survey results show the gradual migration of predictive modeling in commercial lines over time. In its 2009 survey, 40 percent of U.S. companies indicated they were using predictive modeling in commercial lines and another 40 percent said they were planning to do so. Fast forward to five years later, where the most recent survey, released in February 2015, shows that 67 percent of U.S. insurers are using predictive modeling with 27 percent planning to do so. (See Chart 2.) The complete Towers Watson survey includes both the U.S. and Canada and shows that 57 percent currently use predictive modeling and 33 percent are planning to use it.²

Valen’s April survey of 39 property insurance executives also shows predictive modeling activity among commercial insurers. According to the “Valen Summit 2015 Survey”³:

- Forty-five percent have implemented predictive analytics in the last two years.

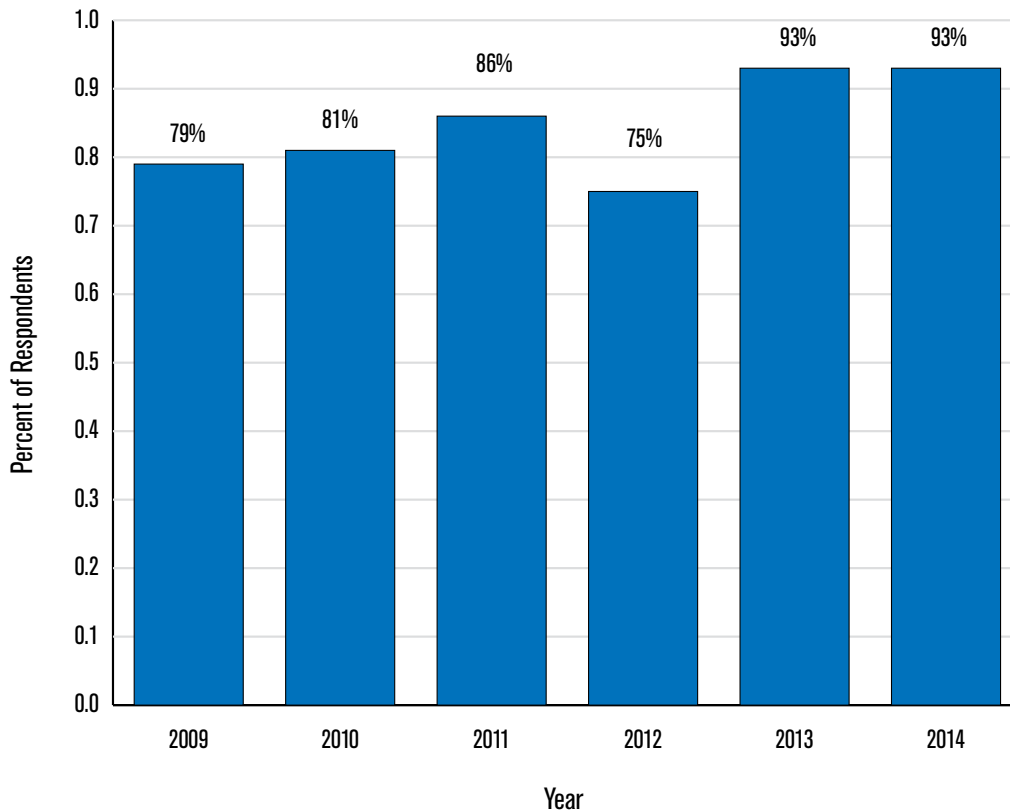
- Fifty-six percent intend to start using predictive modeling.
- Eighty-one percent believe that predictive modeling has a moderate to significant impact when rating agencies such as A.M. Best, Moody’s and Fitch rate underwriting performance.

Big writers in commercial insurance are already doing predictive modeling, with many starting with commercial auto, business owners’ policies and workers’ compensation, Shroyer noted. “If you look at the top 20 writers, all of them are doing it,” he said. “They have the data, they see the value, [so they are] more in the mindset of data-driven decision making.”

Carriers collecting \$150 million or less in premium have been slower to adopt and benefit from predictive modeling, Shroyer said: Besides overcoming barriers between actuaries and underwriters, these insurers lack data for meaningful models, but that can be overcome by accessing additional data.

Chart 2

Currently Use and Plan to Use



Overcoming Resistance

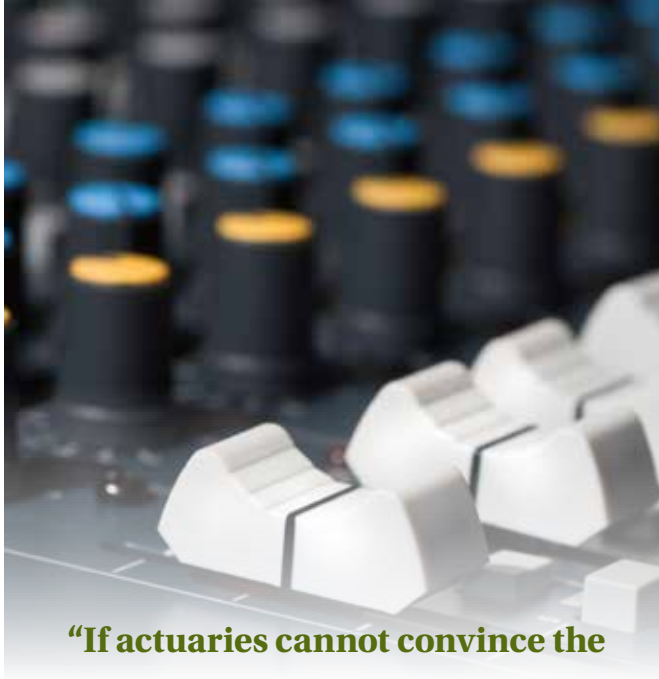
While predictive modeling is a boon to insurers, some underwriters are not necessarily embracing predictive modeling with open arms, according to Valen's April survey. Eighty-two percent of the 39 executives surveyed said underwriting adoption was a "significant" or "high" concern.

There were two main reasons. The first is that underwriters believe their experience is more valuable than a predictive score when assessing risk, according to 24 percent of the executives. Secondly, a quarter of respondents cited underwriters' concern that predictive analytics will replace their jobs. Said David Perez, executive vice president of Liberty Mutual Insurance Group's National Insurance Specialty department, "There is no doubt underwriting jobs are being eliminated in certain sectors," because traditional underwriting was more hands-on in the past. "The underwriting job is going to change."

Predictive modeling offers advantages to underwriters, Shroyer said. Since it addresses simpler risks, underwriters can focus on those clients where the model and intuition are at odds, he added. "It gives the underwriter the flexibility to use the score as a tool rather than being driven by a score."

Actuaries must educate underwriters about predictive modeling and identify how it benefits everyone, Weinstein said. "This is where the actuaries have missed the mark, in providing an understandable education as to the value and reason why these models can be of assistance," he said. "If actuaries cannot convince the underwriter, they are not going to convince the product or state manager, and certainly not the CFO or CEO."

"The future of the actuary," Perez said, "is to be more en-



"If actuaries cannot convince the underwriter, they are not going to convince the product or state manager, and certainly not the CFO or CEO."

— Scott P. Weinstein

gaging and have the ability to articulate what they are working on to the underwriting team," he said. "You cannot have a collaborative environment where only one side collaborates."

Two-Way Understanding

Both professions will need to gain greater understanding to best employ predictive modeling, Perez said. Otherwise, the growing dependency on data and analytics in the insurance sector "can actually stifle industry innovation and risk

taking if there is not a clear communication channel."

"For relationships to blossom, it is about learning more about the other side of the profession or output [and] understanding the mechanics behind each," he added. To encourage collaboration and understanding, Liberty has integrated actuaries into its underwriting team. (See sidebar.)

"Actuaries should know as much about a risk portfolio as possible, but underwriters need to understand the dynamics behind a model just as much," he said. Actuaries also need to appreciate that a "model is a model and it does not address every need ... It's not an end all and be all."

When actuaries accept the feedback underwriters provide it makes a big difference. "Provided we can make adjustments to our model that will incorporate risk specifics and certain changes in underwriting approach that might not be encompassed in the model itself, the underwriters are fine with it and like having a benchmark to work from," Perez added. "This is how everyone can differentiate in a model environment."

Weinstein said that actuaries can build their credibility with underwriters by gaining more experience with as many other functions as possible, from underwriting to marketing. "Actuaries need exposure to claims operations and underwrit-

² <https://www.towerswatson.com/en-US/Insights/Newsletters/Americas/americas-insights/2015/pc-insurers-are-primed-to-leverage-their-predictive-modeling-wins>.

³ <http://valen.com/valen-summit-2015-survey-results/>.

ing, in addition to their traditional focus on pricing, reserving and capital,” he pointed out. “The actuary needs to become a student of both the front-line and back-room operations of the industry ... in some instances it just means moving away from the ‘ivory tower’ and getting their hands dirty.”

Perez takes this one step further. “Quite frankly, commercial insurance is getting so analytical, you will see a growing number of staff from the actuarial world transitioning into the underwriting world, due to the fact that analytical skills and disciplines are becoming a larger part of the underwriting process and are valued more than ever,” he said.

Going Forward

Recognizing the benefit of increased collaboration between actuaries and underwriters, the Casualty Actuarial Society and The Institutes (formerly known as the American Institute for Chartered Property Casualty Underwriters (AICPCU) and the

Insurance Institute of America (IIA)) have entered into a strategic alliance to enhance their premier professional education offerings and deliver innovative educational solutions to the insurance industry and risk management professionals. The alliance was first announced at the CAS 2015 Annual Meeting in Philadelphia last November.

As actuaries learn to better appreciate pricing in a larger context and underwriters gain better understanding of how the models effectively predict risk, both professions will need to adapt to ensure success. The actuaries and underwriters who do this will be able to help their insurers be more competitive. ●

Annmarie Geddes Baribeau has been covering actuarial topics for more than 25 years. Her blog can be found at <http://annmariecommunicatesinsurance.com/>.

The Liberty Solution

Predictive modeling introduces challenges in the underwriting-actuarial relationship, but Liberty Mutual Insurance Group’s, National Insurance Specialty —which provides a range of primary and excess property and casualty products through brokers to the energy, construction and specialty markets — has found a way to maximize the actuary-underwriter relationship.

“Our actuaries needed to be more involved with our businesses and our strategies so they have a better ability to predict outcomes,” said David Perez, executive vice president of the department, which fully integrated actuaries into its underwriting units to create a unified team.

“They not only assist in developing assumptions within our business plans, but we involve them at the transactional level, exposing them to our underwriting and claims processes, and even having them attend broker and client meetings.”

Including actuaries in broker meetings, Perez believes, is not a common practice, but it does create deeper insight into the business by providing actuaries “with a better understanding to execute certain pricing and underwriting assumptions built into our plans and models, as well as giving their own assumptions new perspectives.” This

is meaningful, he added, because agents and brokers are “driving a huge trend for more innovation and specialization as this increases both value proposition and transactional efficiencies.”

In Perez’s department the predictive model is a tool instead of the standard. “This is different because we have to validate to the actuarial team that certain adjustments are accurate,” he said. “The closer they are to the business, the greater they can make the validation.”

The approach also improves communication. “A book of business needs to be evaluated at a granular level in order to maximize the impact of changes in underwriting appetite, risk pricing or mix of business,” he said. “Communication of these portfolio demographics on a real-time basis helps actuaries provide the most accurate analysis possible.”

The approach is also putting Liberty in a better position to address underwriting challenges, such as greater pressure to innovate and increase the level of specialization in risk taking, he said. Another challenge they are starting to see is for “integrating predictive modeling and analytics into potential areas of opportunity that lack robust historical data.”

THE CAS AND THE INSTITUTES

Form Strategic Alliance

By KATE NISWANDER

Initiative will provide educational solutions for risk and insurance professionals



From left to right: Incoming CAS President Stephen P. Lowe, The Institutes President and CEO Peter L. Miller, and CAS President Robert S. Miccolis at the 2015 CAS Annual Meeting.

The Casualty Actuarial Society and The Institutes have entered into a strategic alliance to enhance their premier professional offerings and deliver innovative educational solutions to the insurance industry and risk management professionals. The alliance, which will support and promote professional designation programs and other educational opportunities for insurance and risk professionals, was first announced at the 2015 CAS Annual Meeting in Philadelphia.

The Institutes, formerly the American Institute for Chartered Property Casualty Underwriters, is a leader in delivering education for the risk management and property-casualty insurance industry.

The CAS and The Institutes have collaborated on educational programs for more than 20 years, both sharing a common goal to serve the needs of the P&C insurance industry and risk management professionals. This new alliance will more formally acknowledge the existing close working relationship between the two organizations and provide an official platform for working together on future opportunities.



The CAS currently provides premier credentials for qualified property and casualty actuaries in the designations of Fellow (FCAS) and Associate (ACAS). The CAS also recently announced the creation of The CAS Institute, a subsidiary that will provide new specialty credentials to quantitative professionals in areas such as predictive analytics and data science. The Institutes currently offer nearly 25 specialty certificate and designation programs in claims, risk management, underwriting, and reinsurance, including the designations of Chartered Property Casualty Underwriter (CPCU)¹ and Associate in Risk Management (ARM™).

When announcing the alliance, CAS President Bob Miccolis acknowledged the long-standing relationship with The Institutes. “While our two organiza-

tions often have similar objectives and overlapping roles with respect to certain aspects of the industry, we recognize that it is in our own best interest — as well as the best interest of our members — to continue to work together,” said Miccolis. “We will now serve as an even greater resource to the risk community.”

The Institutes President and Chief Executive Officer Peter L. Miller, CPCU, added, “Our new partnership with the CAS is in line with our ongoing mission to meet the evolving professional development needs of risk and insurance professionals. This alliance is a unique opportunity for our two organizations to leverage each other’s expertise and experience.”

The strategic alliance will enable and enhance complementary offerings between the two organizations for

professional education to the insurance industry and the risk professionals working in the industry, particularly in the application of data analytics in the industry. The Institutes will also assist The CAS Institute with providing state-of-the-art methods for delivering professional education and competency assessment for its new specialty credentials.

Incoming CAS President Stephen Lowe, who began his one-year term at the close of the 2015 CAS Annual Meeting, called the alliance “a prime example of how collaborative efforts within the insurance industry can produce results that benefit a large number of risk professionals.” ●

Kate Niswander is the marketing and communications manager for the CAS.

¹ CPCU is a registered trademark of The Institutes. All rights reserved.

THE CAS INSTITUTE TAKES OFF

By KATE NISWANDER



New CAS subsidiary will launch new credential in predictive analytics and data science.

With the formation of The CAS Institute, the Casualty Actuarial Society is expanding to include specialty credentials for quantitative professionals wanting to keep current in their field.

The CAS Institute will first focus on predictive analytics and data science and will later develop additional credentials in other specialty areas such as catastrophe modeling, capital modeling and quantitative reinsurance analysis.

A subsidiary of the CAS, The CAS Institute brings the rigorous CAS educational standards to developing curricula for these specialty areas. The new credentials are targeted to a wide range of experts, including actuaries, in recognition of their specialized knowledge and their skills in solving real-world practical problems, particularly in practice areas where predictive analytics, data science

and other quantitative skills overlap with actuarial skills.

Candidates for The CAS Institute credentials will follow a pathway that includes a relevant course of study and assessments of practical knowledge and competency. Eligibility requirements will also consider completed academic degrees and relevant coursework, published technical papers and other evidence of expertise in the respective fields.

The CAS Institute will also develop a code of conduct and guidelines for continuing professional development.

“The market demands proven specialized knowledge and competency in today’s competitive environment,” said CAS President Bob Miccolis. “Our new credentials will provide the solution for experts and their employers to demonstrate such expertise.” ●

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Collaboration in a Detariff Market in Malaysia BY SHZE YEONG ONG

When I first started my actuarial career in Malaysia, I had to make a tough decision between joining a well-established life insurance company or a start-up general insurance (GI) consulting firm. Just to set the scene, here were some of my considerations from back in 2010.

- It was common to have about 20 to 50 staff in the actuarial department of a life insurance company but GI companies can operate without having a proper actuarial department as most of the work can be outsourced to a consulting firm for a small fee.
- Most actuaries were already heavily involved in the daily operations of a life insurance company, not

just within the traditional actuarial function but also in other areas, including more senior management roles. On the other hand, there were not many experienced GI actuaries to look up to as a mentor.

- Actuarial roles were pretty much regulatory-driven. GI actuaries were mainly needed to perform and sign off on loss reserve analysis as part of the local regulatory requirement. In terms of pricing, only medical and health insurance products require that an actuarial certification be prepared and signed by a GI actuary.
- Motor and fire (homeowners and commercial property) insurance makes up about 70 percent of the premium written across all GI com-

panies in Malaysia. Insurers have been restricted by a tariff that has not been revised since 1978, so they can only work on segmentation to underwrite the more favorable risk, which can be done by a team of technical underwriters or a portfolio management team.

- With the increasing claim cost, motor insurance became more competitive and the local market had to tighten their underwriting guidelines in order to remain profitable. However, this contributed to a growing residual pool (for the higher risks that are not able to get motor coverage in the local market) in which losses are equally shared by all GI companies.

Despite the advice from my seniors



Participants from the ratemaking seminar in Kuala Lumpur in September 2015. From left to right are Syuhada Nurazmi, Esther Lee, Shze Yeong Ong, Justine Poon, Simon Lee, CAS Past President Mary Frances Miller, Tiffany Tan, Adeline Boey and Hau Kuang Chien.

and peers, I chose to go for the road less taken, a riskier path. Fast forward six years later, now we can see more and more actuarial involvement in GI companies. This involvement escalated with the intention to liberalize the motor and fire insurance rates in 2016 to better suit customers' needs and the regulation requirement for an in-house appointed actuary in every GI company by 2017.

Today, many out of the 30 GI companies have already set up an actuarial function, mostly for the ongoing pricing and reserving work. In terms of pricing,

A key message from the regulatory body is to make sure that no insurance companies fail.

it will be a very new experience for most of the local GI actuaries having to set motor and fire rates for the first time in the market. But the Central Bank of Malaysia, which is the regulatory authority, is very careful to make sure that the industry is ready for this. Hence, implementation will mostly likely be phased in rather than having a full-blown detariff in 2016.

A key message from the regulatory

body is to make sure that no insurance companies fail. It is imperative that the local actuarial profession constantly monitor the financial health of companies, whether it be providing sufficient reserves or setting reasonable pricing rates. ●

Shze Yeong Ong, FCAS, is a general insurance actuary for AIA Berhard in Kuala Lumpur.

Kuala Lumpur Hosts Second Ratemaking Seminar By Shze Yeong Ong

The Casualty Actuarial Society, the Actuarial Society of Malaysia (ASM) and the Institute of Actuaries of Australia jointly organized the General Insurance and General Takaful Ratemaking Seminar to address the needs of the GI actuarial profession. The seminar was held in Kuala Lumpur on September 21-23, 2015, and it attracted more than 70 actuarial professionals from across the region. The event marked the second time that the CAS and the ASM had collaborated.

The seminar began with welcome remarks from ASM President Wan Saiful and CAS Past President Mary Frances Miller. Attendees shared their experiences dealing with data issues and technical pricing, and managing management's expectations. One of the initial concerns for the industry is the lack of pricing experts and that many of the smaller players tend to lose out, primarily because of a lack of credible data for any sophisticated pricing work and higher operating expenses due to lower business volume. Some participants argued that smaller players can go for a niche market and that it is easier for them to adapt to detariffication. Multinational companies tend to rely on regional or global support while local companies can only resort to hiring experts to join the company. Another interesting discussion concerned how to structure the actuarial function in terms of reporting line and scope of work.

ASM Vice President Kelvin Hii and CAS Past President Bob Conger were chief organizers of the seminar.



Attendees of the 2015 ratemaking seminar in Kuala Lumpur, sponsored by the Actuarial Society of Malaysia, the Institute of Actuaries of Australia and the CAS.

P&C Actuaries Lead the Way in Developing and Testing Capital Standards

BY JIM LYNCH

Developing capital standards for insurance has been one of the most complex and detailed efforts of recent years.

Naturally, property/casualty actuaries are in the middle of it.

At the CAS 2015 Annual Meeting, a session titled, “A New Era in Regulatory Capital Standards — An Inside View on How P&C Actuaries Are Effecting Policy Change,” offered the perspectives of three CAS Fellows on several particular issues concerning the property/casualty industry.

The drive to create capital standards involves a flurry of activity on a number of fronts. The National Association of Insurance Commissioners (NAIC) is enhancing its two-decade-old standard for individual companies’ risk-based capital. It is also developing a capital calculation that would be a regulatory tool, not a standard, at the group level.

Europe is finalizing a move to its own capital standard, Solvency II.

International insurance regulators are developing standards for big international insurers and an additional standard for “globally systemically important insurers,” i.e., those whose demise could jeopardize the world economy.

The Federal Reserve Board in the United States is developing an approach to measuring capital for insurers it regulates, which includes those with thrift holding companies. Also involved is the relatively new Federal Insurance Office (FIO), a part of the U.S. Treasury Department created by the Dodd-Frank Act.

On the international stage, U.S.

organizations have to coordinate efforts. The FIO, NAIC and the Federal Reserve Board — together called “Team USA” — work with the International Association of Insurance Supervisors, as that group develops an international capital standard.

The standard is meant to cover both insurance and non-insurance operations and is intended to cover both life and property-casualty operations. Ned Tyrrell, international technical policy advisor for the NAIC, said key issues include determining:

- Whether the standard will be a prescribed standard — a “soft floor” that gives regulators the option to intervene — or a minimum standard — a floor that insurers can’t fall below without regulator intervention. The international standard seems to be moving to the former, Tyrrell said.
- What level of risk the measure is intended to protect against. The international standard will be such that an insurer has at most a one in 200 chance of insolvency, known as a 99.5 percent value-at-risk standard.
- What time horizon the standard is intended to protect. The international standard protects for one year, meaning that the chance of insolvency is at most a one in 200 in the next year.

The one-year time horizon, Tyrrell noted, doesn’t mesh well with the long-tailed risks in property/casualty insurance. How, he asked, does the risk of a slow-building liability calamity like

asbestos fit into a one-year time frame?

Meanwhile, the U.S. actuaries have been looking at the more than two-decade-old risk-based capital standards, said Lauren Cavanaugh, an actuary and senior director with FTI Consulting. The American Academy of Actuaries provides input on solvency issues and keeps actuaries informed on proposed changes. The CAS is conducting research through its Risk-Based Capital Dependencies and Calibration Working Party.

The CAS working party developed a time-tested actuarial yardstick — actual vs. expected analysis. This working party compared the actual discounted loss plus discounted reserve runoff of companies with the underwriting risk implied by the risk-based capital formula, which is currently calibrated to an 87.5th percentile. They found that approximately 89 percent of company-year data points observed underwriting losses less than the level implied by the risk-based capital formula, an 89% safety level, Cavanaugh said. Further, for the largest companies, this safety level is higher than for the smallest companies.

The research also showed what Cavanaugh called a “minor lines effect” — in general, companies that have a very small percentage of total premium in a line of business have greater underwriting risk variability in that line.

The Academy’s Property and Casualty Risk-Based Capital Committee creates recommendations based on the information, she said, to help improve the risk-based capital formula.

David Payne, an actuary and senior manager at EY, works closely with Sol-

vency II, the European standard scheduled to go into effect January 1, 2016.

Solvency II has similarities with the NAIC risk-based capital measure, Payne said.

Insurers have to hold enough assets to cover their best estimate of liabilities, plus a capital cushion to handle negative surprises that can arise over one year. The result is the “soft floor” that Tyrrell described. A separate calculation for the minimum standard is also present within Solvency II.

Solvency II differs from the U.S. approach to capital measurement because it offers insurers the option to use

their own internal model, if the insurer receives regulatory approval. Otherwise, the insurer must follow a standard formula.

“It’s very difficult to get an internal model approved,” Payne said. Seven separate rigorous tests must be passed. Alternatively, insurers can supplant part of the standard model with their own work to arrive at a “partial internal model,” but this must also be approved.

Payne held that one notable concern involving all parties is that much of the work is relatively new. Capital standards for Switzerland, Bermuda and Australia have only been in place

a few years. Solvency II and a Chinese standard take effect January 2016.

“Many of the issues being encountered are new for insurers,” Payne observed. “A lot of this hasn’t been implemented yet and there is still uncertainty around some of the rules.”

While the effort is complex, it is another example of how the actuary’s quantitative skill and intellectual rigor can help the insurance industry. ●

James P. Lynch, FCAS, is chief actuary and director of research and information services for the Insurance Information Institute in New York.

Come Together: Experts Explore How Data Scientists and Actuaries Can Work in Harmony BY JIM LYNCH

Insurers have become more interested in the science of data as they develop more sophisticated predictive models to help them price and underwrite business. In the past, actuaries played the primary role of helping insurers turn their troves of data into prices for next year’s policies. Increasingly data scientists now join actuaries in playing these important roles. Data scientists are trained to find patterns in big data — the megasets of information to be gleaned from structured data sets (like an insurance database), as well as unstructured data sets (collections of photographs or millions of tweets).

A general session panel at the CAS 2015 Annual Meeting explored the ways that insurers can benefit from combining the unique skills that actuaries and data scientists have to offer.

Barry Franklin, FCAS, a senior vice president and chief risk officer at Zurich

North America, moderated the discussion with panelists representing the spectrum from actuary to data scientist:

- Christopher Steinbach, FCAS, an actuary who works with data scientists as chief pricing actuary for global specialty lines at AIG.
- Dr. Swapnil Chhabra, a data scientist and an experienced analytics professional who has worked in several industries, including insurance. Dr. Chhabra currently leads data science projects in Zurich’s predictive analytics center of excellence.
- Louise Francis, FCAS, specializes in deep data dives and is founder of Francis Analytics and Actuarial Data Mining Inc.

In his job as a high-level actuary, Steinbach often reviews predictive modeling projects. Some have been useful, he said, including one that helped iden-

tify which claims were likely to settle for the highest amounts and which could be settled quickly. That model helped the claims department prioritize work.

Not every model is useful, however. Steinbach cited common issues: A model could be too big for the users to digest, or it could rely on data that doesn’t exist at the time the model is intended to be used. If the model contradicts an existing decision-making process, he said, it won’t be used until that conflict is resolved. Making models predictive is different from making them useful. Modelers need to deliver models that are both predictive and useful.

The model also has to make intuitive sense, or it won’t be used. Steinbach said that it’s not enough to determine that one color airplane crashes more than an airplane of another color. The model users want to know why the planes crash because the best courses of

action differ according to the cause.

“Being able to explain why the model works is important,” Steinbach said.

Steinbach envisioned a future in which data science will be a separate corporate department. The relationship with actuaries would resemble the relationship between actuarial and information technology departments. Actuaries would tap data scientists for big, complex projects but could handle smaller ones more efficiently on their own.

Extending that chain of thought, Dr. Chhabra opined, “Machine-learning tools employed by contemporary data scientists can facilitate the work done by actuaries — not only in handling complex unstructured data sets but also in

automating several actuarial processes.”

While legislative restrictions may limit the application of unconventional algorithms for certain insurance products, other business areas could greatly benefit by their use. “We should employ computational tools with the highest predictive power wherever possible — data scientists and actuaries can work together to identify those niches,” Dr. Chhabra said.

Dr. Chhabra said that the future is about improved business processes driven by automation. Actuaries and data scientists will work hand-in-hand to get there.

Francis predicted that some actuaries would drift into data science while some data scientists would become actuaries. Initiatives like The CAS Insti-

tute’s new specialty credential in predictive analytics and data science would encourage such crossover, she said. (See story on page 36.)

Francis noted that both disciplines are likely to remain vibrant. “I don’t think either one is going away,” said Francis.

Concluding the session, Franklin drew a distinction between the two disciplines: data scientists use powerful tools to develop insights, following the data wherever it leads; actuaries study data within defined hypotheses, adding structure, business knowledge and professional standards to the work. In other words — data scientists know the math and actuaries understand the business.

“The real power will be when they learn to work together,” stated Franklin. ●

The CAS Looks to Cultivate a Multifaceted, Diverse Profession

BY JIM LYNCH

Having a diverse work force enables business leaders to understand the many facets of a competitive corporate world, and it can be financially beneficial as well.

Four members of the CAS shared ideas on how to increase diversity within the profession at the Society’s 2015 Annual Meeting in Philadelphia.

In March 2015, the CAS adopted a formal Diversity Strategy that encourages an inclusive community where differences are celebrated and lists several specific strategies to accomplish that goal. The CAS Annual Meeting session was a chance for open discussion on how to continue furthering this strategy.

David Terné, a Fellow of the CAS

and an assistant vice president at the Hartford, showed the CAS statistics indicating that in recent years newly credentialed actuaries have come from a variety of backgrounds. The number of Asian actuaries, for example, is growing rapidly. In the past five years more than one-fourth of new actuaries self-report Asian descent, about 10 times the share in 1989. The share of other U.S. minorities is growing slowly, but remains tiny, each under 2 percent of the newly credentialed.

“There is a mixed picture,” Terné said. “For Asians the percentage has gone up, which is great, but we still struggle with other demographic classes.”

And the growth in diversity comes

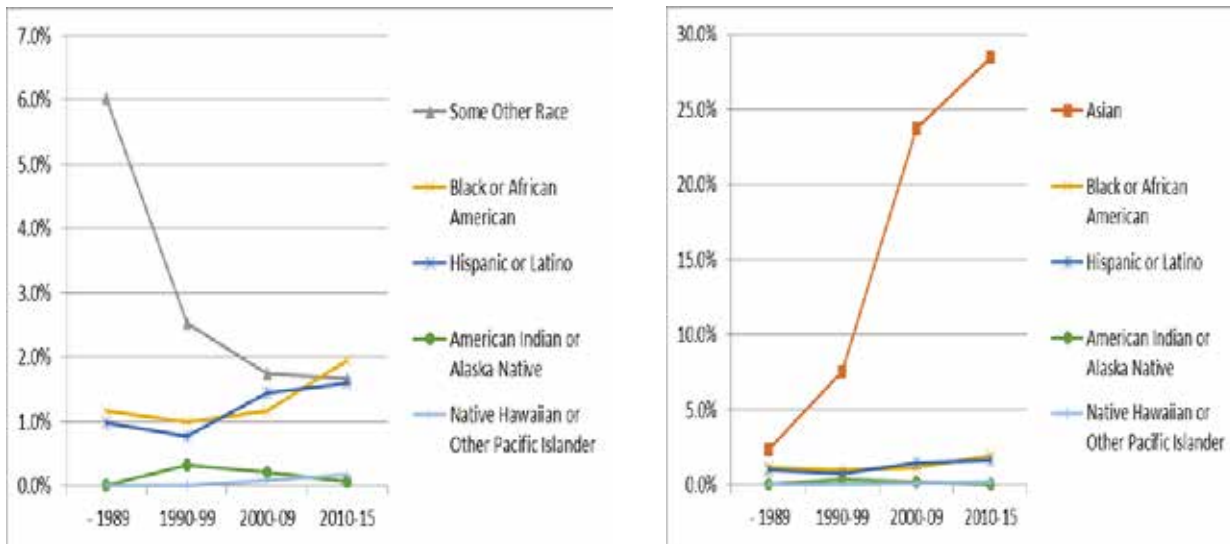
in part from the CAS’s increasingly international reach. Many of the new Asian actuaries are based in Asia.

Most of the growth in actuaries of African descent comes from persons born in Africa or the Caribbean, noted CAS Fellow Arthur Randolph, a senior consulting actuary at Pinnacle Actuarial Resources.

“It makes us ask what we are not doing here in the United States that other countries have already figured out,” he said.

Incoming CAS President-Elect Nancy Braithwaite, FCAS, noted that there are many measures of diversity that are not as easy to quantify, such as sexual orientation, religion, disability or military service. “We look at the numbers we

Ethnicity by Membership Class



have in front of us, but they can't always give us the whole picture," she said.

The CAS already does some outreach with diversity initiatives, including work from the Joint CAS/SOA Committee on Career Encouragement and Actuarial Diversity (JCCEAD) and the CAS Diversity Committee, chaired by Terné. The CAS Diversity Committee has representation from the International Association of Black Actuaries (IABA), with whom it coordinates events.

Among the efforts that the CAS currently participates in (often in conjunction with the JCCEAD):

- Reimbursing exam fees for diverse candidates.
- Partially funding universities with summer programs for diverse students.
- Building stronger relationships with professional STEM (science, technology, engineering and math) organizations that focus on diverse groups.
- Fostering communication across the society regarding diversity issues.

Today scholarships also remain an important incentive in diversity work. Both panel moderator Roosevelt Mosley, FCAS, and fellow panelist Randolph were recipients of diversity scholarships from the Joint CAS/SOA Committee on Career Encouragement and Actuarial Diversity.

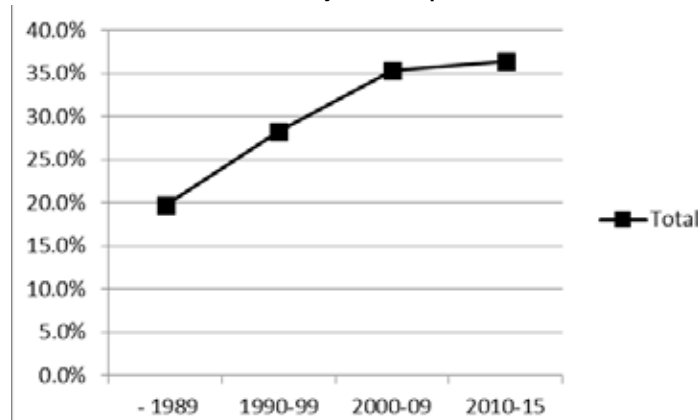
The aid helped, Mosley said, but "Just giving scholarships is not enough to encourage diversity." The IABA, for example, was finding that there weren't a lot of persons of African descent in high school STEM programs, meaning the pool of potential candidates had shrunk

before college.

In addition, the actuarial profession, despite repeated No.1 rankings as the best job in America, remains one of the more obscure math-centric professions. "We're competing with the accountants, the engineers, the scientists," Mosley said, whose reputations are well-known at the middle-school level and even earlier grades.

The CAS is doing its part to actively engage student audiences through its CAS Student Central program, which provides free membership and resources to students looking to pursuing a

Female by Membership Class



career as an actuary. However, more can always be done to continue championing these efforts.

Braithwaite mentioned that it is important to increase the visibility of diverse groups by, for example, recruiting diverse speakers at actuarial meetings — more Asians, African-Americans, women and persons from India presenting.

Randolph recommended that actuaries themselves become educated on why diversity is important in the workplace. Organizations thrive when many points of view are represented, he said, and a healthy CAS — and a healthy profession overall — will continue to depend on diversity.

“This is a critical next step for us as an organization,” Randolph said. ●

Lifetime ACAS

	ACAS Attained 1990-1999	ACAS Attained 2000-2009	Total
Non-Hispanic White	26%	18%	21%
Asian	25%	9%	12%
Some Other Race	17%	21%	19%
Black or African American	33%	44%	40%
Hispanic or Latino	43%	25%	30%
American Indian or Alaska Native	0%	100%	50%
Native Hawaiian or Other Pacific Islander	N/A	0%	0%
Grand Total	29%	19%	24%
Minorities	32%	38%	36%

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EXPLORATIONS BY JAMES GUSZCZA

Greater Actuarial Science: Thoughts on the Future of Our Profession

Kicking off the first annual meeting of the Casualty Actuarial Society’s second century, outgoing president Bob Miccolis announced the formation of the CAS Institute (abbreviated “iCAS”), a subsidiary that (to start) will offer credentials in data science. At the meeting the questions “what is data science, anyway?” and “how does it relate to actuarial science?” were on many people’s minds. As an actuary whose job title includes “data scientist” and as one with a long-standing interest in the history and philosophy of science, I cannot resist weighing in.

Let’s start with our own field. I often hear actuarial science described as a branch of applied mathematics focused on modeling and pricing insurance risks. I used to parrot this implicit definition myself, but now find it way too narrow a frame. Insurance was an early adopter of probabilistic and statistical methods because of a distinctive feature of insurance products: One does not know the cost of selling an insurance contract at the time of sale. Therefore costing insurance contracts and reserving for insurance liabilities involves more than accounting; it involves statistical inference and forecasting. Actuarial science is inherently a form of data science.

To be sure, insurance has many distinctive aspects. But the use of probability and statistics is no longer one of them. To illustrate, consider two stories. The first is classic adverse selection: An in-

surer that uses (say) credit score or (say) chess club memberships to selectively market insurance to young male motorcycle drivers can adversely select against its competitors — it can skim off the best risks and offer then attractive rates, while its competitors must raise the rates for its deteriorating book of business. The second story is Michael Lewis’ *Moneyball*. Billy Beane, the general manager of the cash-strapped Oakland A’s, realized that by basing scouting decisions on data analysis, he could hire talented baseball players that richer teams were blind to. (The “blindness” was in the

Actuarial science is inherently a form of data science.

minds’ eyes of the richer teams’ baseball scouts, who systematically used biased unaided judgment, rather than publicly available data, to make multimillion dollar decisions.)

Each story involves what behavioral scientists and economists call decision making under uncertainty. At the time of sale, we don’t know which driver will crash his motorcycle, and at the time of hire, we don’t know which employee will perform well or poorly on the job. The spoils go to the competitor who makes the best use of data. Just as more sophisticated use of data enables nimble insurers to profitably grow, it enabled the cash-poor Oakland A’s to rise up in the ranks. Paraphrasing Michael Lewis, better, data-enabled management can

run circles around taller piles of cash. More generally, analytically sophisticated competitors can thrive in inefficient markets, improve inefficient business processes and sometimes even achieve breakthrough innovations.

These are two classic illustrations of data science enabling better business decisions; they can equally well be viewed as examples of what I think of as “greater actuarial science.” The idea is threefold: First, 21st century actuarial science takes on board the continually evolving tools and methods of modern data science. Second, greater actuarial

science is not restricted to the insurance industry; it is about professionals making better, more evidence-based, decisions under uncertainty in a variety of private and public sector domains. Third, though quantitative, greater actuarial science is not a branch of applied mathematics; it is an applied quantitative social science, akin to, and overlapping with, such fields as marketing science, people analytics, behavioral economics, and personalized health and wellness.

Data Science

Following Drew Conway’s famous Venn diagram,¹ data science is often described as the intersection of mathematical and statistical methods, computing

¹ <http://drewconway.com/zia/2013/3/26/the-data-science-venn-diagram>.

with data and domain knowledge. Data science encompasses each of what the late Leo Breiman called the “two cultures”² of statistics: using data to estimate parametric models and applying non-parametric “statistical learning” methods to rich datasets (big data). Actuarial applications of generalized linear models, copula models, multilevel/hierarchical models and Bayesian data analysis all fall in the former category. Thanks to the skewed nature of insurance losses, credibility issues, the heterogeneous and/or emergent character of many insurance risks, and the need to forecast uncertain quantities into the future, the use of what statisticians call “generative models” will always be core to our field. But it is equally true that insurance data scientists routinely use such statistical learning techniques as nonparametric techniques as random forests, boosted trees and regularized regression to build better pricing, underwriting, claim triage and price elasticity models.

Contiguous Disciplines

In recent decades, the availability of computing power, data and open-source statistical and statistical learning algorithms have all grown at a roughly exponential rate. Perhaps the same could be said of the awareness of the power of data-driven decision making in many areas of business and public policy. This has

resulted in a rapidly growing demand for creative professionals who are equally fluent in the language of business and the methods of data science. Data science actuaries who have built claim fraud, customer churn, price elasticity, predictive hiring or customer segmentation solutions for insurance organiza-



tions can do the same for noninsurance organizations. My own experience is that experienced data scientists can successfully work outside their domains by collaborating with nontechnical subject matter experts. Doing so requires more than technical skills alone; also required are creativity and associative thinking, the intellectual curiosity needed to learn new domain-specific concepts, and the ability to communicate with colleagues who are nontechnical or specialists from other domains. In short, the data science revolution enables actuaries of a certain

stripe not just to deepen their foundations, but also to expand their professional footprint to include new applications both within and beyond insurance.

Computational Social Science

In many ways, insurance risks pertain to physical things: expensive cars cost more to repair; wood frame houses are more likely to burn down than brick ones; and injured workers with multiple comorbidities are likely to be out of work longer. And yet insurance company underwriting, fraud investigation, marketing, strategic, claims adjusting and hiring decisions are made by people subject to both cognitive biases and organizational pressures. Insureds’ purchasing decisions are influenced by both the way choices are arranged (the “choice architecture”) and such cognitive biases as the availability

heuristic³ (one’s estimate of an event’s probability is often a function of how easily it comes to mind). Furthermore, previously unimaginably detailed analyses of insureds’ risk behavior is now possible thanks to the “digital breadcrumbs” we all leave behind as we go about our digitally mediated existences. All of which is to say: There is more to “greater actuarial science” than big data and algorithms. Twenty-first century actuarial science should be viewed as one of the social sciences, not a branch of applied mathematics. ●

² <https://projecteuclid.org/euclid.ss/1009213726>

³ http://www.casact.org/community/affiliates/CANE/0412/Guszcza_Rethinking_Rationality.pdf

IN MY OPINION BY GROVER EDIE

Slow Down to Speed Up

By the time you read this, you will have had enough time to have made and broken your new year's resolutions — at least I will have!

Do a search on the web on New Year's resolutions and you'll find plenty of lists, suggestions, ads for smoking cessation, weight reduction, fitness and other "top ten" resolutions. Ask your friends or relatives what you should put on your list at your own peril.

I am happy to report that my 2015 New Year's resolution, which was my older son's recommendation,

was to try to go for a walk the first thing in the morning. Doing this helps calm me down for the entire day. I haven't done it every day (it was raining this morning) but I do it enough that it is therapeutic.

This year I have decided to slow down. "Slow down to speed up" is my mantra for 2016.

Of course, I will also try the usual "lose weight," "be a nicer person,"

"quit procrastinating" (that has been on my list for decades) and "eat better."

Not on the list is to "give up coffee." I got a book for my birthday titled *The Healing Powers of Coffee*. I haven't read it yet, but I have taken the title to heart. (I am looking for a new book on the healing powers of wine.)

I am not planning on retiring or even cutting back my work hours. That is not the kind of slow down I am planning. (I'm not quite ready to slow down my driving. Cars go 90 MPH for a reason.)

Slow Downs and Stops

Here's what I am planning to do.

Slow down and observe. I will take notice of everything around me, especially people.

Stop and think before asking a question. I am going to ask myself if I already know the answer or if I am asking someone else because I am too lazy to think and remember that answer.

Stop plunging into a job before planning. In the morning before work I'll take some time to plan the workday. Before I begin a new project, I'll take a few minutes to think about it and plan it.

Slow down the transition from one task to another. I aim to finish one task by completing my documentation and then putting it all away before moving on to something else. To tidy up my workplace, I might even throw away the drafts and notes I no longer need. I might even do that to my electronic files.

Slow down by putting things where they belong.

If I fail at this one, my wife, Diane, will bring out this document and remind me I didn't keep my resolution!

Slow down and enjoy the meal.

Enjoy conversations with others and savor the flavors.

Stop trying to do more in a day.

I will not try to pack so much into a day that I feel frazzled that 40 difficult tasks didn't get done. I will try to get a couple of items done, but done better and with less stress to myself.

In My Opinion

Today's fast pace has infected us with a feeling we must work faster, move faster, do faster.

I think if we slow down, we can get more done that matters. ●



Make Your Mark!

The following is an excerpt from the Address to New Members given at the CAS Annual Meeting in Philadelphia on November 16, 2015.

To the new Fellows: Enjoy the moment. You've achieved something great. Now take that achievement as a springboard to even greater accomplishments. Here are some possibilities:

- Become the CEO of an insurance company or consulting firm.
- Become the head of research for your firm.
- Take predictive modeling to new dimensions — for example, investments, marketing or something completely outside of the insurance space.
- Become the chief actuary for your company or office.

Whatever the vision, the key thing is to set goals for your career and work towards them. The objectives may even change and evolve over time.

How will you get there?

Let's start with some of the qualities or strengths that you will need:

- **Determination.**
- **Enthusiasm and passion.** I'll never forget the advice of my first boss ... He said: "Remember. If you can't get excited about something you've worked so hard at and know so well, how can you expect your audience to?" He was right!
- **Communication skills.** All of us have something to sell. The greatest actuarial work product will never be

implemented if you can't convince your management. So work hard on improving your speaking and writing skills.

Now, how to apply these qualities and strengths:

- **Work hard and have a positive attitude.** It's amazing what you can accomplish with these qualities.
- **Build your network.** Go to lunch with your underwriter, claims rep, lawyer or client and get to know them. Listen to their concerns. Be proactive.
- **Use your time wisely.** It is precious.
- **Be ready.** When you go to a meeting, whether it is an internal one or an external one, go prepared. You will probably be one of the few who has! You can have a strong influence on the meeting and make it much more productive.
- **Do your best.** Apply your best effort to everything that is given to you.

Many of you

have young families.

Don't become so obsessed with your *work* life that you neglect your *family* life ... Find a balance between your professional life and your personal life.

Finally, with your achievement comes some responsibilities:

- To continue

your education.

- To extend the expertise of the profession.
- To give back to your profession by actively participating in CAS committees and other activities. (By the way, this is not a totally altruistic goal. Joining a CAS or Academy committee is a great opportunity to network and make friends who will last a lifetime. Joining a CAS committee right away after receiving my Fellowship was one of the best things I did in my career.)
- To conduct yourself always in an ethical and professional manner with an eye on the soundness of your company.
- To make a difference by paying it forward.

Now take some time to celebrate your achievement. May God bless you as you go out. Spread your wings and make your mark! ●

Steven G. Lehmann, FCAS, MAAA, FCIA, FSA, was elected CAS president in November 1998. He works for Abacus Actuarial Consulting, LLC, in Bloomington, Illinois.



A pride of CAS past presidents: Left to right are Gary Josephson, the author Steven Lehmann, Wayne Fisher and Jim MacGinnitie.



IT'S A PUZZLEMENT BY JON EVANS

DNA Sequencing

Craig, a genetic engineer, is trying to sequence a DNA sample from an ancient dinosaur as part of a research grant from a private theme park resort on an island. Craig consults his brother Gary, a statistical modeler, to determine if the sequencing can be completely finished within a year. Craig's DNA sequencer can read a single linear segment 5,000,000 base pairs long for each hour it is running. The sequencer can only match the linear segments together if they overlap by at least 2,000,000 base pairs. The segments can only be sampled (with replacement) in a completely random way from a long circular strand of dinosaur DNA. The sequencing finishes when every base pair has appeared in at least one sampled segment that can be "spliced together" by matching its overlap with other sampled segments so as to sequence the complete circle of base pairs. Gary responds that there is a 99 percent chance the sequencer will finish within a year. How many base pairs long is the strand of dinosaur DNA?

Buffon's Sphere Inside a Triangulated Honeycomb

In this problem, all of space is filled with a tetrahedral-octahedral tessellation (or honeycomb). All edge lengths are equal to a constant L . A sphere with radius R materializes at a random point in space. If there is a 50 percent probability that the sphere lies entirely within a single polyhedral cell, what is R/L ? More gen-

erally, what is the corresponding probability for any R/L ?

Puzzle solver Bob Conger answers these questions along the following lines. Every face is shared by a tetrahedron and an octahedron, but an octahedron has eight faces versus four on a tetrahedron, so the space contains twice as many tetrahedrons as octahedrons. Given a constant length L of the sides, the volume of an octahedron is four times that of a tetrahedron.

Therefore, $2/3$ of space is filled with octahedrons, and $1/3$ with tetrahedrons. Thus, there is a $2/3$ probability that the center of the sphere will fall within an octahedron, and $1/3$ probability that the center will fall within a tetrahedron.

Next construct another tetrahedron (octahedron) inside each tetrahedron (octahedron) in the tessellation, with the walls of the interior shape being a uniform distance R inside the walls of the exterior shape. If and only if the center of the sphere is within one of these newly constructed polyhedrons, the sphere will be entirely within a polyhedron of the tessellation.

The radius of an inscribed sphere that is tangent to each face of the tetrahedron is $L/\sqrt{24}$ (or $L/\sqrt{6}$ for an octahedron). The corresponding radius for a constructed tetrahedron is $L/\sqrt{24}-R$ (or $L/\sqrt{6}-R$ for a constructed octahedron). Note, the constructed radius being >0 is necessary for any possibility that the sphere falls entirely within a tetrahedron (octahedron). In this case the ratio of the volume of a constructed tetrahedron

to the volume of an original tetrahedron is $(1 - (R/L) \cdot \sqrt{24})^3$ (or $(1 - (R/L) \cdot \sqrt{6})^3$ for the octahedrons). Therefore, the overall probability of the sphere materializing entirely within a polyhedron is:

$$\begin{aligned} & (1/3) \times \{ [1 - (R/L) \cdot \sqrt{24}]^3, \text{ subject to a} \\ & \text{minimum of zero} \} \\ & + (2/3) \times \{ [1 - (R/L) \cdot \sqrt{6}]^3, \text{ subject to a} \\ & \text{minimum of zero} \} \end{aligned}$$

For probability = 50 percent, the solution is, if you can stand going through the formula for a cubic polynomial,

$$\frac{R}{L} = \frac{6 + \frac{4}{(69 + 5\sqrt{193})^{1/3}} - (69 + 5\sqrt{193})^{1/3}}{10\sqrt{6}}$$

or with simple numerical root finding about 0.06531.

The probability is zero percent when $R/L \geq 1/\sqrt{6}$. As R/L is decreased from this value, the probability continuously rises achieving every value on the open interval (0%, 100%). The probability can be set arbitrarily close to 100 percent by selecting R/L small enough. For example, $R/L = .001$ produces a probability of approximately 99 percent.

Editor's Note: Solutions for the July/August 2015 puzzle, "The Darkness between the Stars and the Size of the Universe," were sent in by Jay Call and Bob Conger. ●

**Know the answer?
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GEORGIA - SENIOR RESERVING ACTUARY

Ezra Penland has an EXCLUSIVE SEARCH for a senior property and casualty insurance reserving actuary for Position 67624 in Atlanta. FCAS or ACAS with 10+ years of experience. Management experience ideal. Create and maintain reserves models. Work closely with management and actuaries. Some risk management experience a plus.

NORTHEAST USA - ACTUARIAL ANALYST

For Position 67719, a property and casualty actuarial analyst is sought by an international client with Northeast USA offices. Must have 6 months to three years of property and casualty actuarial experience, including some experience with either modeling or reserve analysis or statistical programming or pricing or risk management.

NEW YORK - INVESTMENT BANKING ACTUARY

New York investment bank has asked us to find a property and casualty actuary for Position 67350. FCAS or ACAS. Requires advanced insurance reserving experience. Exceptionally interesting actuarial modeling, competitor analysis and scenario testing work. Work very closely with management. Ideal candidates will have 5 to 12 years of property and casualty actuarial experience. Several years of financial and quantitative modeling experience preferred.

ILLINOIS - CONSULTING ACTUARY

ACAS or FCAS needed by our growing Illinois client for Position 67627. Ideal candidates will have 3 to 12 years of property and casualty actuarial experience. Must have experience with modeling, reserving and ratemaking. Hands-on role.

MIDWEST USA - ACTUARIAL ANALYST

For Position 67517, a Midwest USA commercial lines insurer is planning to hire an actuarial analyst. Actuarial analyst must have 1 or more years of property and casualty actuarial experience, as well as 2 to 5 actuarial exams. Pricing, predictive modeling, reserving, financial reporting and other assignments. Exam study program in place.

USA - FCAS PRICING ACTUARY

USA property and casualty insurance company is looking to hire an FCAS pricing actuary for Position 65774. Compensation up to \$300K. Manage staff. Personal lines high profile opportunity. Immediate need.

MIDWEST USA - MANAGING ACTUARY

Managing property and casualty insurance actuary is immediately needed by a Midwest USA insurer for Position 67464. FCAS required. Product development, pricing, reserve analysis, trend studies, actuarial modeling and statistical analysis role.

GEORGIA - LEAD PRICING ACTUARY

Ezra Penland Actuarial Recruitment's exclusive Atlanta client plans to hire a Lead Property and Casualty Insurance Pricing Actuary for Position 67625. Reports to Chief Actuary. Exceptional modeling skills and communications skills are required. FCAS or ACAS with 10+ years of property and casualty actuarial experience preferred. Work closely with claims professionals, underwriters, legal, actuaries and others.

OHIO - RESEARCH ACTUARY

For Position 67413, an Ohio insurer has asked Ezra Penland to find a property and casualty insurance research actuary. FCAS or ACAS with 6 to 15 years of property and casualty actuarial experience preferred.

ILLINOIS - SENIOR ACTUARIAL ANALYST

Property and casualty actuarial consultant and senior actuarial analyst is sought by our Chicago client for Position 67626. Reserving, modeling and actuarial exam study role. Must have 2+ years of experience and 3+ actuarial exams. Compensation up to \$110K.

SOUTHEAST USA - ACAS OR SENIOR ANALYST

For Position 67233, an insurer is looking for a senior actuarial analyst or ACAS associate actuary. Requires 3+ years of property and casualty actuarial experience. Must have 2 to 7 years of predictive modeling experience. Create and maintain predictive pricing models. High profile opportunity in a growing department.



These Roles and Many Other Actuarial Jobs Can Be Found at EzraPenland.com